10

STANDING COMMITTEE ON WATER RESOURCES

(2010-11)

FIFTEENTH LOK SABHA

MINISTRY OF WATER RESOURCES

AUGMENTATION OF DEPLETED GROUND WATER LEVEL, SUSTAINABLE DEVELOPMENT, CONSERVATION, MANAGEMENT, USE OF GROUND WATER AND PREVENTION OF WATER POLLUTION

TENTH REPORT

LOK SABHA SECRETARIAT
NEW DELHI

August, 2011/Bhadrapada,1933 (Saka)

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Presented to Lok Sabha on 30.08.2011

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LOK SABHA SECRETARIAT
NEW DELHI

August, 2011/Bhadrapada, 1933 (Saka)

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COMPOSITION OF THE STANDING COMMITTEE ON WATER RESOURCES (2010-2011)

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3. **Shri B.S. Dahiya - Director**
4. **Smt. Rita Jailkhani - Additional Director**
5. **Shri G. Guite - Committee Officer**

ABBREVIATIONS

BCM	-	Billion Cubic Meters
BIS	-	Bureau of Indian Standard
BOD	-	Bio-Chemical Oxygen Demand
CGWA	-	Central Ground Water Authority
CGWB	-	Central Ground Water Board
FPARPs	-	Farmers Participatory Action Research Programmes
CWC	-	Central Water Commission
DoDWS	-	Department of Drinking Water Supply
EC	-	Electrical Conductance
ETO	-	Exploratory Tubewells Organisation
ISRO	-	Indian Space Research Organisation
JNNURM	-	Jawaharlal Nehru National Urban Renewal Mission
MoU	-	Memorandum of Understanding
MoE&F	-	Ministry of Environment & Forests
MNREGS	-	Mahatma Gandhi National Rural Employment Guarantee Scheme
MPN	-	Most Probable Number
NAREGA	-	National Rural Employment Guarantee Act
NRDWP	-	National Rural Drinking Water Programme
NRCP	-	National River Conservation Plan
NCT	-	National Capital Territory
NOC	-	No Objection Certificate
RRR	-	Repair, Renovation & Restoration
WRIS	-	Water Resources Information System
WEGWIS	-	Web Enabled Ground Water Information System
WUAs	-	Water Users' Association

INTRODUCTION

I, the Chairman, Standing Committee on Water Resources (2010-2011) having been authorized by the Committee, do present on their behalf the Tenth Report to Parliament on 'Augmentation of Depleted Ground Water Level, Sustainable Development, Conservation, Management, Use of Ground Water and Prevention of Water Pollution' .

2. The Committee (2009-2010) took up as an additional subject "'Depletion of Ground Water Level' for a detailed examination and Report. The Committee were briefed by the representatives of the Ministry of Water Resources and Central Ground Water Board on the subject at their sitting held on 09 February 2010. The Committee also took oral evidence of the representatives of the Ministries of Water Resources, Environment and Forests and the Agriculture on various aspects of the subject at their sitting held on 07 April 2010.

3. The Committee at their sitting held on 11 August 2011 considered and adopted the Report subject to amendments/modifications made in the Report after incorporating the suggestions made by the Hon'ble Members and the inaccuracies arising out of factual verification of the Report by the Ministry. The Committee have also decided to change the title of the Report to ''Augmentation of Depleted Ground Water Level, Sustainable Development, Conservation, Management, Use of Ground Water and Prevention of Water Pollution' in view of changes made in the body of the draft Report .

4. The Committee wish to express their thanks to the officers of the Ministries of Water Resources, the Ministry of Environment and Forests and the Ministry of Agriculture who appeared before the Committee and placed their considered views. They also wish to thank the Ministry of Water Resources for furnishing the requisite material on the points raised by the Committee in connection with the examination of the subject.

5. The Committee would like to place on record their sense of deep appreciation for the invaluable assistance rendered to them by the officers of the Lok Sabha Secretariat attached to the Committee.

NEW DELHI **DIP GOGOI,**
29 August, 2011 ***Chairman,***
07 Bhadrapada, 1933(Saka) ***Standing Committee on Water Resources***

PART-I

REPORT

CHAPTER-I

INTRODUCTORY

Water is a prime natural resource, a basic human need and a precious national asset for any country, and which also belongs to a larger ecological system. Being a scarce and valuable resource, water has to be developed, conserved and managed on an integrated and environmentally sound basis to ensure its availability and quality on a sustainable and long-term basis. India possesses an estimated 1,123 billion cubic meters (bcm) of utilisable water out of an annual estimated available water to be about 1,869 bcm. The share of replenishable ground water resources is only 433 bcm. Over 80 per cent of rural and about 50 per cent of urban and industrial water requirements of India are being met from ground water sources. Further, about 45 per cent of created irrigation potential in the country is through development of ground water sources.

1.2 Ground water is found in a variety of geological formations. Basically, from ground water point of view, rock formations are grouped into unconsolidated, semi-consolidated and consolidated formations. Further, the occurrence and movement of ground water in various aquifer systems is highly complex due to the occurrence of diversified geological formations with considerable lithological and chronological variations, complex tectonic framework, climatological dissimilarities and various hydrochemical conditions. India has been broadly divided into five distinct regions, *viz.* Northern Mountainous Terrain and Hilly Areas, Indo-Gangetic-Brahmaputra Alluvial Plains, Peninsular Shield Area, Coastal Area, and Cenozoic Fault Basin and Low Rainfall Areas. The ground water regime shows marked variations in these regions.

1.3 In the last few decades, increasing extraction of ground water for various uses, without due regard to the yield characteristics and recharging capabilities of aquifer system in the country, has resulted in depletion of ground water resources in certain parts of the country. Fall in water level more than 2 meters on long term basis has been observed in areas like parts of Madhya Pradesh, Uttar Pradesh, Gujarat, Eastern Rajasthan, Haryana, Punjab and Eastern Maharashtra, Andhra Pradesh and Karnataka. Apart from this, pollution of water is a serious problem, leading to ailments like cancer. In fact, out of 45,019 km. of the total length of major rivers in India, 33 per cent of the stretches are polluted. This situation calls for an urgent need for addressing the issue of overall depletion of ground water resources. Fortunately, ground water is a replenishable resource. Rainfall is the principal source of recharge to ground water. Other sources of recharge include canals, irrigated fields and water bodies.

1.4 The National Water Policy, April, 2002 formulated by the Ministry of Water Resources, Government of India impresses upon the need for proper ground water resources planning, development and management in the country which is reproduced as follows :

> "Exploitation of ground water resources should be so regulated as not to exceed the recharging possibilities, as also to ensure social equity. The detrimental environmental consequences of over-exploitation of ground water need to be effectively prevented by the Central and State Governments. Ground water recharge projects should be developed and implemented for improving both the quality and availability of ground water resource."

1.5 The monitoring of ground water regime in India is being carried out since 1969 by Central Ground Water Board (CGWB), a multi-disciplinary scientific organization under the Ministry of Water Resources which stands as the apex organization in the field of ground water in India. The Government of India has launched various initiatives with the objective of achieving long-term sustainability of ground water resources. These initiatives include Central schemes like 'Ground

Water Management & Regulation', State Sector scheme like 'Artificial Recharge of Ground Water through dug wells', 'Demonstrative Projects' and 'Rain Water Harvesting', and 'Farmers Participatory Action Research Programmes' (FPARPs), regulatory measures for rain water harvesting, setting up of regulatory body like 'Central Ground Water Authority' (CGWA) and several steps taken to popularize the concept of artificial recharge among stakeholders and the concept of water management and conservation in general.

1.6 The Committee took evidence of the following witnesses :

(1) Special Secretary, Ministry of Water Resources and Chairman, Central Ground Water Board on 09.02.2010.

(2) Secretary and Commissioner, Ministry of Water Resources on 07.04.2010.

Apart from oral testimony of the witnesses above mentioned, the Committee obtained background papers and documents from MoWR, CGWB. The questions which remain unanswered or the clarifications which could not be obtained during evidence, post-evidence replies/clarifications were obtained from the MoWR.

1.7 The Committee's examination of the subject 'Augmentation of Depleted Ground Water Level, Sustainable Development, Conservation, Management, Use of Ground Water and Prevention of Water Pollution' *inter-alia* included the review of the total ground water resources of India (including distribution), issues relating to development, depletion and pollution of ground water resources in various parts of the country, measures taken by Government for ground water augmentation and other related aspects including the views of the Ministry have been dealt within the succeeding Chapters of this Report.

CHAPTER-II

GROUND WATER RESOURCES SCENARIO IN INDIA

Water is a basic human need and a prime natural resource and precious national asset. Ground water is an essential and vital component of our life support system. The ground water resources are being utilized for drinking, irrigation and industrial purposes. Over 80% of India's rural domestic water requirements and about 50 per cent of its urban and industrial requirements are being met from ground water sources. Further, about 45 per cent of created irrigation potential in India is through development of ground water sources.

Occurrence and spatial distribution

2.2 India is a vast country with varied hydrology owing to diversified geological, climatological and topographic settings. Water-bearing rock formations called 'aquifers', range in age from Archaean to Recent. The country has been broadly divided into five distinct regions, viz, Northern Mountainous Terrain and Hilly Areas, Indo-Gangetic-Brahmaputra Alluvial Plains, Peninsular Shield Area, Coastal Area, and Cenozoic Fault Basin Arid and Low Rainfall Area. The ground water regime shows marked variations in these regions. The rugged *Northern Mountainous Terrain* in Himalayan region extending from Kashmir to Arunachal Pradesh being characterized by steep slopes and high runoff, offers limited scope for ground water storage though it acts as source of recharge for Indo-Gangetic and Brahmaputra alluvial plains. The *Indo-Gangetic-Brahmaputra Alluvial Plains* covering the States of Punjab, Haryana, Uttar Pradesh, Bihar, Assam and West Bengal have a vast and thick alluvial fill, exceeding 1,000 m. at places, constituting the most potential acquifer system in the country. Ground Water development in this region is still sub-optimal, except in the States of Haryana and Punjab and Western Uttar Pradesh. The *Peninsular*

Shield is located south of Indo-Gangetic-Brahmaputra plains and consists mostly of consolidated sedimentary rocks, Deccan Trap basalts and crystalline rocks in the States of Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, Orissa and Kerala. Occurences and movement of ground water in these formations are restricted to weathered residuum and interconnected fractures at deeper levels and have limited ground water potential. *Coastal tracts* in the States of Gujarat, Kerala, Tamil Nadu, Andhra Pradesh and Orissa have a thick cover of alluvial deposits of Pleistocene to Recent age and form a potential multi-aquifer systems in these States. However, inherent quality problems and the risk of seawater ingress impose severe constraints in ground water development from these aquifers. The *Cenozoic Fault Basins* have been grouped separately owing to its peculiarity in terms of presence of three discrete fault basins, the Narmada, Purna and Tapti valleys, all of which contain extensive valley fill deposits. The aquifer systems in arid and semi-arid tracts of this region in parts of Rajasthan and Gujarat receive negligible recharge from the scanty rains and the ground water occurrence in these areas is restricted to deep aquifer systems, most of them tapping fossil water.

Ground Water Resources Potential

2.3 The natural chemical composition of ground water is influenced predominantly by type and depth of soils and subsurface geological formations through which ground water passes. Ground water quality is also influenced by contribution from the atmosphere and surface water bodies. Quality of ground water is also influenced by anthropogenic factors. For example, over-exploitation of ground water in coastal regions may result in sea water ingress and consequent increase in salinity of ground water. Similarly, excessive use of fertilizers and pesticides in agriculture and improper disposal of urban/industrial waste can cause contamination of ground water resources.

Ground water contains a wide variety of dissolved inorganic chemical constituents in various concentrations, resulting from chemical and biochemical interactions between water and the geological materials. Inorganic contaminants including salinity, chloride, fluoride, nitrate, iron and arsenic are important in determining the suitability of ground water for drinking purposes.

2.4 The Ministry in a written reply stated that the dynamic ground water resource in the country has been assessed jointly by Central Ground Water Board and concerned State Government authorities. The assessment has been carried out with Block/Mandal/Taluka/Watershed as the unit. As per the latest assessment, the annual replenishable ground water resource in this zone has been estimated in 2004 as 433 billion cubic meters (bcm) out of an estimated 1,123 bcm of utilizable water in the country. The State-wise availability of ground water resources in India is given in table 2.4.

Table 2.4 : State-wise ground water availability in 2004

BCM/y

S. No.	States/Union Territories	Annual Replenishable Ground Water Resource
1.	2.	3.
	States	
1	Delhi	0.30
2	Punjab	23.78
3	Rajasthan	11.56
4	Haryana	9.31
5	Tamil Nadu	23.07
6	Gujarat	15.81
7	Karnataka	15.93
8	Uttar Pradesh	76.35
9	Uttarakhand	2.27
10	Madhya Pradesh	37.19
11	Maharashtra	32.96

Table 2.4 (Contd.)

12	Kerala	6.84
13	Andhra Pradesh	36.50
14	West Bengal	30.36
15	Bihar	29.19
16	Himachal Pradesh	0.43
17	Goa	0.28
18	Assam	27.23
19	Jharkhand	5.58
20	Chhattisgarh	14.93
21	Orissa	23.09
22	Sikkim	0.08
23	J&K	2.70
24	Tripura	2.19
25	Nagaland	0.36
26	Mizoram	0.04
27	Manipur	0.38
28	Meghalya	1.15
29	Arunachal Pradesh	2.56
	Total States	432.42
1	Daman & Diu	0.009
2	Pondicherry	0.160
3	Lakshadweep	0.012
4	Dadra & Nagar Haveli	0.063
5	Andaman & Nicobar	0.330
6	Chandigarh	0.023
	Total UTs	**0.597**
	Grand Total	**433.02**

CHAPTER-III

ISSUES OF GROUND WATER DEVELOPMENT, DEPLETION & POLLUTION

Development of ground water resources

3.1 Admittedly, India possesses an estimated 433 bcm of replenishable ground water resources. However, the representatives of Ministry of Water Resources informed the Committee that only 58 per cent of the total replenishable ground water resources is being utilised in the country for various purposes. The Committee were also informed that the development of ground water in different areas of the country is highly uneven. Whereas in the Eastern part of the country most of the areas are safe because the ground water exploitation is very limited, in the Western part and in the North-western part of the country and southern part of the country, large areas are over-exploited which includes States of Rajasthan, Haryana, Punjab, Western Uttar Pradesh, Gujarat, Maharashtra and also Karnataka, Andhra Pradesh and Tamil Nadu where the ground water exploitation is very high. But in States like eastern Uttar Pradesh, Bihar, West Bengal, and most parts of Orissa and the entire North-east, the level of ground water exploitation is very low. The region-wise availability of ground water resources in 2004 and status of utilization in India are given in table 3.1.

Table 3.1 : Region-wise availability of ground water in India

Sl. No.	Region	Annual Replenish-able Ground Water Resource (bcm)	Natural Discharge during non-monsoon season (bcm)	Net Annual Ground Water Availability (bcm)	Annual Ground Water Draft (bcm)	Stage of Ground Water Develop-ment (%)	Categorization of assessment Units (numbers)	
							Over Exploited	Critical
1	Northern Himalayan States	5.40	0.48	4.92	1.84	37	2	0

Table 3.1 (Contd.)

2	North Eastern Hilly States	33.99	3.02	30.98	5.63	18	0	0
3	Eastern Plain States	111.63	9.03	102.5	43.97	43	1	2
4	North Western Plain States	80.78	6.92	73.85	72.17	98	201	28
5	Western arid States	27.38	1.97	25.40	24.48	96	172	62
6	Central Plateau States	90.723	5.19	85.53	36.11	42	31	6
7	Southern Peninsular States	82.78	7.14	75.65	46.40	61	432	128
8	Islands	0.34	0.01	0.32	0.01	4	0	0
	Country Total	**433.02**	**33.77**	**399.26**	**230.63**	**58**	**839**	**226**

Note : Northern Himalayan States – Himachal Pradesh, Jammu & Kashmir, Uttarakhand; North Eastern Hilly States – Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura; Eastern Plain States – Bihar, Orissa, Eastern Uttar Pradesh and West Bengal; North Western Plain States – Delhi, Haryana, Punjab, Western Uttar Pradesh, Chandigarh, Western arid States – Gujarat, Rajasthan, Daman & Diu; Central Plateau States – Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Dadra & Nagar Haveli; Southern Peninsular States – Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry; Islands – Andaman & Nicobar, Lakshadweep.

3.2 When asked about the factors responsible for sub-optimal development of ground water in Assam (North-east), Bihar, West Bengal and parts of Uttar Pradesh as compared to Haryana, Punjab and western Uttar Pradesh, the Ministry in a written reply stated as follows :

> "Sub-optional development of ground water in Assam, Bihar, West Bengal and parts of Uttar Pradesh could be attributed to availability of surface water resources, coupled with socio-economic factors like fragmented land holdings, lack of adequate infrastructure facilities and financial conditions of majority of farmers.

The National Rainfed Area Authority, Ministry of Agriculture, in its report 'Food Security, Water and Energy Nexus' has mentioned that 'the ultimate analyses reveal that puddle rice cultivation is the main culprit of excessive exploitation of ground water in north-west India' and hence decline in ground water table."

3.3 Regarding the reasons for development of only 58 per cent of the total replenishable ground water resources in the country, the Ministry in a written reply stated that the development of ground water in different areas of the country is highly uneven. Intensive development of ground water in certain areas in the country particularly North-Western India, Western India and Peninsular India has resulted in its over-exploitation. The overall ground water development of the country is 58% which presents an aggregate status of ground water utilization in the country.

Meaning and causes of ground water depletion

3.4 Increasing extraction of ground water for various uses without due regard to the yield characteristics and recharging capabilities of aquifer system in the country have resulted in depletion of ground water resources in certain parts of the country. Depletion of ground water is defined as *"the withdrawal of water from a ground water source at a rate greater than its rate of recharge, usually over an extended period of several years."*

3.5 According to the Ministry, the decline in ground water table in some parts of the country is, therefore, primarily due to withdrawal of ground water in excess of natural recharge. Absence of appropriate regulatory mechanism at the State level is another major factor. Other reasons for decline in ground water levels are as follows :

(a) Increasing demand of ground water for agriculture, industrial and drinking purposes.

(b) Change in cropping pattern and growing of paddy and cash crops that consume large quantities of water.

(c) Scanty rainfall in arid and semi-arid regions.

(d) Large ground water extraction during drought when all other sources shrink.

(e) Flat rate/free electricity for extracting water in certain States.

(f) Rapid pace of urbanization resulting in reduced natural recharge to aquifers.

Assessment and Monitoring of ground water level

3.6 Trends of ground water levels have been analysed in terms of the difference in ground water levels measured during May 2009 in the observation wells of Central Ground Water Board (CGWB), compared with the mean water levels of the previous decade (May 1999- May 2008). The results indicated that ground water levels have shown a decline in about 55 per cent of observation wells during the period. Further, fall in water level more than 2 meters on long term basis has been observed in various parts of Madhya Pradesh, Uttar Pradesh, Gujarat, Eastern Rajasthan, Haryana, Punjab, Eastern Maharashtra, Andhra Pradesh and Karnataka.

3.7 According to the Report of Central Ground Water Board, as on March 2004, against availability of ground water of 0.28 bcm, withdrawal for irrigation, domestic, industrial use is being made annually to the tune of 0.48 bcm. in NCT Delhi. Further, out of 9 zones in Delhi, only 2 are safe zones and the remaining 7 were reported to be over-exploited zones in terms of ground water development. Observations made by CGWA on 197 wells in regard to changes in the past 10 years, i.e. between January 2000 to January 2009, reportedly reveals that ground water levels registered a fall in 143 wells as against rise noticed in only 54 wells. The status of ground water (meters below ground level) as observed from 201 wells is given in table 3.7.

Table 3.7 : Status of ground water levels (Meters below ground level)

	May 2009	August 2009	November 2009	January 2010

0-2 m	6	9	15	11
2-5 m	42	41	43	46
5-10 m	54	46	47	48
10-20 m	49	51	46	48
20-40 m	29	30	27	28
>40 m	21	21	22	23

3.8 When asked whether the receding water table has reached an alarming situation, the Ministry in a post-evidence reply stated as follows :

> "As per the latest assessment of replenishable ground water resources carried out by CGWB jointly with State agencies, about 29 per cent of the assessment units (blocks, talukas or watersheds) have been categorized as 'over-exploited', 'critical' or 'semi-critical'. Long-term decline in water levels observed mainly in these areas, mostly located in the north western, western and Peninsular India, is a matter of concern. However, ground water situation in about 70 per cent of the assessment units in the county is "Safe".

3.9 The Ministry also stated that the identification of the assessment units of 'over-exploited', 'critical' and 'semi-critical' units has been made on the basis of stage of ground water development and long-term water level decline. In 'over-exploited' areas, the stage of ground water development exceeds the net annual ground water availability and long term ground water level decline observed either in pre-monsoon or post-monsoon period or both. In 'Critical' areas, the stage of ground water development is above 90 per cent and within 100 per cent of net annual ground water availability and significant decline is observed in the long term water levels in both pre-monsoon and post-monsoon periods. In 'semi-critical' units, the stage of ground water

development is between 70 per cent and 100 per cent and significant decline in long term water level has been recorded in either Pre-monsoon or Post-monsoon.

The State-wise categorization of blocks/mandals/talukas as 'over-exploited', 'critical' and 'semi-critical' assessment units in the country is given in table 3.9.

Table 3.9 : State-wise categorization of water exploitation

S. No.	States/Union Territories	Total No. of Assessed Units	Over-exploited		Critical		Semi- Critical	
			Nos.	%	Nos.	%	Nos.	%
	States							
1	Andhra Pradesh	1231	219	18	77	6	175	14
2	Arunachal Pradesh	13	0	0	0	0	0	0
3	Assam	23	0	0	0	0	0	0
4	Bihar	515	0	0	0	0	0	0
5.	Chattisgarh	146	0	0	0	0	8	5
6	Delhi	9	7	78	0	0	0	0
7	Goa	11	0	0	0	0	0	0
8	Gujarat	223	31	14	12	5	69	31
9	Haryana	113	55	49	11	10	5	4
10	Himachal Pradesh	5	0	0	0	0	0	0
11	Jammu & Kashmir	8	0	0	0	0	0	0
12	Jharkhand	208	0	0	0	0	0	0
13	Karnataka	175	65	37	3	2	14	8
14	Kerala	151	5	3	15	10	30	20
15	Madhya Pradesh	312	24	8	5	2	19	6
16	Maharashtra	318	7	2	1	0	23	7
17	Manipur	7	0	0	0	0	0	0
18	Meghalaya	7	0	0	0	0	0	0
19	Mizoram	22	0	0	0	0	0	0
20	Nagaland	7	0	0	0	0	0	0
21	Orissa	314	0	0	0	0	0	0
22	Punjab	137	103	75	5	4	4	3
23	Rajasthan	237	140	59	50	21	14	6

Table 3.9 (Contd.)

24	Sikkim	1	0	0	0	0	0	0
25	Tamil Nadu	385	142	37	33	9	57	15
26	Tripura	38	0	0	0	0	0	0
27	Uttar Pradesh	803	37	5	13	2	88	11
28	Uttarakhand	17	2	12	0	0	3	18
29	West Bengal	269	0	0	1	0	37	14
	Total States	**5705**	**837**	**15**	**226**	**4**	**546**	**10**
	Union Territories							
1	Andaman & Nicobar	1	0	0	0	0	0	0
2	Chandigarh	1	0	0	0	0	0	0
3	Dadra & Nagar Haveli	1	0	0	0	0	0	0
4	Daman & Diu	2	1	50	0	0	1	50
5	Lakshadweep	9	0	0	0	0	3	33
6	Pondicherry	4	1	25	0	0	0	0
	Total	**18**	**2**	**11**	**0**	**0**	**4**	**22**
	Grand Total	**5723**	**839**	**15**	**226**	**4**	**550**	**10**

Impact of climate change and Monsoon on water availability

3.10 The Committee wanted to know the impact of climate change on water availability. To this, the Ministry gave a written reply as follows :

> "As per India's Initial National Communication to United Nations Framework and Convention on Climate Change (NATCOM, 2004) submitted by Ministry of Environment and Forests; climate change is likely to adversely affect the water balance in different parts of India due to changes in precipitation and evapotranspiration and rising sea levels, leading to increased saline intrusion into coastal and island aquifers. Increased frequency and severity of floods may affect groundwater quality in alluvial aquifers. Increased rainfall intensity may lead to higher runoff and possibly reduced recharge.
>
> Indian Network of Climate Change Assessment (INCCA), of Ministry of Environment and Forests has released an assessment report in November, 2010 covering four major regions of the country.
>
> Himalayan region :

The water yield in the Himalayan region, mainly covered by river Indus, is likely to increase by 5%-20% in most of the areas, with some areas of Jammu and Kashmir and Uttarakhand showing an increase of up to 50% with respect to the 1970s. The impact of increase in precipitation in this region has been reflected in an almost similar pattern of increase in the ET. Increase in the water yield is more for those areas that have experienced a low increase in ET.

North-Eastern region :

The trend in precipitation in the North-Eastern region exhibits considerable spatial variability in water yield in the 2030s but is in line with the projected patterns of precipitation and evapotranspiration. The northern parts of the North-East in the 2030s, with respect to 1970s, show a reduction in precipitation by 12%. The central portion of the North-eastern region shows an increase in precipitation by 0% to 25%. However, the majority of the North-Eastern region except for Mizoram, Tripura, Manipur and Assam shows an increase in the evapotranspiration in the 2030s. As a result, a reduction in water yield by up to 20% is projected for Arunachal Pradesh. The increase in the water yield in Assam and Manipur is projected to increase by 40%.

Western Ghats :

The Western Ghats region exhibit wide variability in water yield in the 2030s. The northern portion of the Western Ghats shows a decrease in the water yield, ranging from 10%-50% in the 2030s with respect to the 1970s. The central portion, however, indicates an increase in the water yield between 5% and 20%. The southern portions of Karnataka and Kerala show a decrease in the yields upto 10%.

Coastal region :

There is a general reduction in water yield in the eastern coastal region of West Bengal, Orissa and the northern coastal regions of Andhra Pradesh. The reduction in water yield in the 2030s in this region is as less as 40%. However, in the southern parts of Andhra Pradesh and northern parts of Tamil Nadu, the water yield is projected to rise by 10%-40%. The western coastal region also shows an overall reduction in water yield (ranging from 1%-50%) except for the coast along Karnataka, which shows an increase in water yield in the 2030s by 10%-20% with respect to the 1970s. No change in water yield is projected for the 2030s in the southern tip of the coastal region."

3.11 On the question of variation in Monsoon patterns and its impact on water availability, the Ministry in a written reply further stated as follows :

"Specific issues related to Monsoon are addressed by the India Meteorological Department (IMD).

As per the information provided by IMD, there are extensive studies on rainfall analysis on seasonal as well as annual time scales to find out the change, if any, in the rainfall pattern over India. All these studies discussed long term trends of Indian monsoon rainfall for the country as a whole as well as for smaller regions. The monsoon rainfall is without any trend and mainly random in nature over a long period of time, particularly on the all India time scale. Since rainfall is having high spatial variability, existence of long term trend in smaller spatial scale was already reported. The alternating sequence of multi-decadal periods of thirty years having frequent droughts and flood years are observed in the all India monsoon rainfall data. The decades 1961-70, 1971-80 and 1981-90 were dry periods. The first decade (1991-2000) in the next 30 years period already experienced wet period. Decadal variability is more for the June and September months while the decadal variability of July rainfall is almost similar to that of monsoon rainfall. July rainfall has shown decreasing trends over most parts of central India. However, June and August rainfall has shown increasing trend over the central and south western parts of the country. During the southwest monsoon season, three subdivisions viz. Jharkhand, Chattisgarh, Kerala showed significant decreasing trend and eight subdivisions viz. Gangetic WB, West UP, Jammu & Kashmir, Konkan & Goa, Madhya Maharashtra, Rayalseema, Coastal Andhra Pradesh, and North Interior Karnataka showed significant increasing trends. June rainfall is getting importance as its contribution to annual rainfall is increasing in almost 20 sub-divisions in which three are increasing significantly while decreasing in the remaining 16 subdivisions out of which three are significant. Contribution of July rainfall is decreasing in central and west peninsular India (significantly in South interior Karnataka (95%), East M.P.(90%), Vidarbha (90%), Madhya Maharashtra (90%), Marathwada (90%), Konkan & Goa (90%), and North interior Karnataka (90%)). But contribution of August rainfall is increasing in all these areas."

Models practiced abroad for ground water replenishment

3.12 When asked to give the best models in the area of replenishing the ground water levels being practised outside the country, the Ministry stated as follows :

"In Arizona (USA), over-exploitation and falling water levels are addressed by legislation that mandates balancing abstraction with recharge. To address ground water depletion in the State's most populous areas, the State Legislature enacted the Groundwater Code in

1980. The goal of the Code is two fold: 1) to control severe groundwater depletion and 2) to provide the means for allocating Arizona's limited groundwater resources to most effectively meet the state's changing water needs.

Oman's successful strategy for sustainable ground water management has deftly combined demand side measures to control, protect and conserve water resources with supply side measures to augment the resources. Demand side measures include obligatory registration of all wells, introduction of well permits, national well inventory, well metering, improving irrigation techniques, public awareness campaigns for water conservation, etc. while the supply side measures include large recharge dams."

Ground water quality, pollution and its monitoring

3.13 The quality of the available ground water resources is another important aspect that needs attention. The National Water Policy, 2002 of India aptly emphasizes the need for maintaining water quality in the country, which is reproduced below :

"Both surface water and ground water should be regularly monitored for quality. A phased programme should be undertaken for improvements in water quality."

3.14 Pollutants responsible for ground water contamination are basically of two types, viz. geogenic and anthropogenic. *Geogenic* contaminants are those which get dissolved in the ground water from the sediments or litho-units constituting the aquifer systems. *Anthropogenic* contaminants, on the other hand, have their origin from human activities. It is stated that inherent salinity (electrical conductance) and presence of chemical constituents such as fluoride, arsenic, nitrate and iron in excess of permissible limits for drinking are examples of geogenic contamination, whereas industrial effluents, use of fertilizers and pesticides in agriculture, urban sewerage, etc. result in anthropogenic contamination of ground water.

3.15 It is stated that the Central Ground Water Board (CGWB) is monitoring the chemical quality of ground water through a network of Ground Water Observation Wells during the month of May every year and analyzing them in 16 Regional Chemical Laboratories of the Board. There are also Ground Water Organisations at the State level in this regard. Monitoring of ground water quality is an effort to obtain information on chemical quality and its temporal variations through representative sampling in different hydrogeological units. In addition, ground water samples are also collected and analysed as part of scientific studies of the Board such as ground water management studies and ground water exploration. Special studies are also taken up in areas of identified water quality problems. One of the main objectives of the ground water quality monitoring is to assess the suitability of ground water for drinking purposes. The Bureau of Indian Standards (BIS) has recommended the quality standards for drinking water, and these have been used for finding the suitability of ground water. On this classification, the natural ground water of India has been categorized as 'desirable, 'permissible' and 'unfit for human consumption.'

3.16 On the basis of the analysis of water quality data collected by CGWB, the areas/locations having salinity, fluoride, arsenic, iron and nitrate have been demarcated. A report on 'Ground Water Quality in Shallow Aquifers of India' has also been compiled by CGWB. As per this report, the number of districts having water quality problems or water contamination in States and UTs have been identified and the same are reproduced in table 3.16.

Table 3.16 : Contaminated water districts

Sl.No	State	No. of Districts having				
		Nitrate >45 mg/l	Fluoride >1.5 mg/l	Iron >1 mg/l	Arsenic >0.05 mg/l	Salinity >3000 Micro Seimens/cm
1	Andhra Pradesh	23	19	15	-	16
2	Assam	-	4	18	1	-
3	Bihar	9	9	19	15	-
4	Chattisgarh	12	12	4	1	-
5	Delhi	7	5			3
6	Goa			2		
7	Gujarat	22	18	6		21
8	Himachal Pradesh	1				1
9	Haryana	19	14	17		14
10	Jammu & Kashmir	2	2	6		
11	Jharkhand	11	6	6		
12	Karnataka	23	20	22		15
13	Kerala	11	1	14		1
14	M.P	46	19	25		6
15	Maharashtra	29	8	20		17
16	Manipur			2		
17	Meghalaya		3			
18	Orissa	28	11	21		1
19	Punjab	17	11	9		8
20	Rajasthan	33	30	29		28
21	Tamil Nadu	27	17	2		21
22	Tripura			4		
23	U.P	42	10	15	9	7
24	Uttarakhand	3				
25	W.Bengal	2	8	15	8	5
	Total	**367**	**227**	**271**	**34**	**164**

3.17 In addition to presence of salinity, fluoride, arsenic, iron and nitrate, the presence of heavy metals like manganese, lead, chromium, cadmium, etc. in ground water have been noticed in some parts of the country. Heavy metal pollution in ground water is caused due to mining activities or

seepage from untreated industrial waste. The Ministry have stated that ground water in a major part of the country is generally suitable for drinking, irrigation and industrial use.

3.18 The Ministry of Environment and Forests during the evidence informed the Committee that there are 1,79,999 habitations, which are having water problems. It has fluoride, arsenic, iron, salinity and nitrate. Fluoride is present in 33,363 habitations, arsenic in 9,504 habitations, there is problem of iron in 11,872 habitations. Salinity problem is in 32,689 habitations. Nitrate problem is in 2,571 habitations. The Ministry has only Rs.40 crores budget for the whole country for Common Affluent Treatment Plant and for Industrial Pollution Control.

3.19 The MoWR in reply to a query of the Committee stated that for addressing this issue of natural pollution, that is *geogenic pollution,* what the Central Ground Water Board does is that it finds an alternative source of water which is free from that pollution. For example, in Indo-Gangetic plain area of Eastern U.P., West Bengal and Bihar arsenic contamination is very prevalent. So, the first is that they identify the areas where there is arsenic. Then, they have exploration in the nearby areas and find out the aquifers which are free from arsenic pollution which can be used for drinking purpose. As for *man-made pollution*, one thing is about the enforcement of various laws which is necessary. The second thing is technical assistance which the Ministry of Agriculture provides to the people about the optimum use of fertilizers and pesticides for crops so that the pollution is minimized. The CGWB suggests and evolves techniques which are disseminated to the States.

3.20 Pollution of river water can effect the quality of ground water in aquifers hydraulically connected with them due to percolation. In the case of surface water, it is stated that organic pollution measured in terms of bio-chemical oxygen demand (BOD) & coliform bacterial count

gives the indication of the extent of water quality degradation in different parts of our country. It is observed that nearly 67 per cent of the observations are having BOD less than 3 mg/l, 18 per cent between 3-6 mg/l and 15 per cent above 6 mg/l. Similarly, total and faecal coliforms which indicate presence of pathogens in water is also a major concern. Nearly 50 per cent observations are having total coliform and 67 per cent observations are having faecal coliform less than Most Probable Number (MPN) 500/100 ml criteria designated for bathing.

3.21 The Central Water Commission monitors water quality at 371 locations on major rivers of the country. The water quality sample analysed by CWC indicates that river water pollution has increased over the years and more stretches of rivers are getting polluted due to increase urbanization, increase in industrial activities and use of more material resources by the population in general.

3.22 On being asked about the number of polluted rivers/canals in the country, the representative of Ministry of Environment and Forests informed the Committee during evidence as follows :

> "As far as pollution-related matter is concerned, there are only 45,019 kms. length of rivers in the country. This is the length of major rivers, out of which 67 per cent is clean and 33 per cent stretches are polluted."

3.23 The representative of the Ministry of Environment and Forests further informed the Committee that 33 per cent of stretches of rivers are polluted and one of major reasons is discharge of untreated sewage in the rivers. This does not include industrial wastes from factories. Attributing this basic problem to our incapacity to tackle the sewage discharge into the rivers, the representative informed the Committee as follows :

"At present, in our country, only 30 per cent sewage treatment capacity we have been able to generate. For 70 per cent, we have not been able to make sewage treatment plant. There is a scheme called JNNURM, wherein a lot of money is being given. This is under the Ministry of Urban Development, but still the gap between the demand and supply is huge and they have problems. They are run by the municipalities. There are operational and maintenance issues. Electricity supply is not available. Electricity cut is for 10 to 15 hours. You must have noticed that they divert to big cities like Kanpur and that sewage directly merges in river Ganga. This is the issue at municipal level."

3.24 Excessive use of farm inputs like fertilizers, pesticides and insecticides do enormous damage to ground water. There is a very big area, that is Bhatinda in Punjab, which is known as cancer belt only because of misuse of fertilizers. It is a very big problem, because every agriculturalist uses some fertilizers. When the Committee asked during evidence whether any mechanism has been evolved to control use of fertilizer, the representative of the Ministry of Agriculture replied as follows :

"Regarding the use of fertilizers, basically we advise the farmers what is to be the optimum fertilisers to be used for different crops. Beyond that, generally, we do not give advisories to the farmers.

In so far as one more issue which hon. Member has raised regarding the salinity part of it is concerned, in case it is a cultivable land, then we do have a very small scheme. Whenever the State Government approaches, then from our Budget provisions, we do have some treatment method for the land affected by salinity in case it is a cultivable land.

One more question which was raised over here is, what kind of steps we can take for prevention of overuse of pesticides and harmful chemicals which could affect the human population in case there is overuse. I only recollect one case in which the Government of Kerala had approached the Central Government regarding the use of *endosulfan* in which, after a lot of deliberation, a study was conducted and based on the study as well as the recommendation of the State Government, we issued a notification that *endosulfan* should not be used in Kerala. So, these are the very specific cases in which the State Government approaches the Central Government regarding the harmful effects of the pesticides on the human population. In case the State Governments are also very keen on prevention and use of certain pesticides, a study could be conducted and based on the study, further step for addressing the issue could also be taken.

These are limited points, but we do not have any specific study to pinpoint regarding the overuse of fertilizer and the effect on the water as well as human population."

3.25 During evidence, the Committee raised the issue that some industries, in the name of aquifer recharge, made structures for aquifer recharge, but actually ended up discharging the polluted water to the aquifer below the ground. When asked what action is being taken to put a stop to this hazardous practice of industries, the Ministry informed the Committee as follows :

> "We have a tie-up with Central Environment Ministry under which comes the Central Pollution Control Board; and we have recently centrally issued directions to those who are at lower levels and to the scientists who are with us, to make some inspection (studies) as well. Whenever permission has been given to set up industries, to dig out water and make on-the-spot examination of the water so as to see that they are not injecting polluted water underground."

Issue of penalizing polluters of water

3.26 The Committee pointed out during evidence that specially in Eastern U.P., there are sugar factories along with alcohol plant. These are run for 12 months and their water goes not only to rivers but also to the paddy fields. The hand pump water is also red. On being asked whether any punishment is there for polluters, the representative of the MoE& F gave the following reply :

> "Right now, in pollution, there is the Environment (Protection) Act 1986; the main responsibility of its implementation is of the State Pollution Control Boards. But it is worth noting that State Pollution Control Boards are also not able to perform their jobs because of certain reasons."

3.27 Since the States have not been able to effectively curb polluting activities by industries, the Committee asked during the evidence about the role of the Ministry of Environment and Forests is playing in prevention of pollution by industries. The reply of the MoE&F in the matter is reproduced as follows :

> "The Centre has made Central Pollution Control Board. That is supposed to give technical advice and give overall guidance to the functioning of the State Pollution Control Board, but the consent to industries to operate is given at the State level. The Ministry gives

environmental clearance for new industries. Before a new industry or an infrastructural project is established, environmental clearance is given by the Ministry of Environment and Forests."

3.28 The Committee further asked the representatives of the Ministry of Environment and Forests to explain the powers under which their Ministry can stop the pollution. To this the representative of the MoE&F explained as under:

"Whenever anyone has to set up an industry, first they have to obtain Environment Clearance."

3.29 On being asked if after obtaining the clearance if they do not adopt the norms, what are the powers of the Ministry, the representative of the Ministry of Environment and Forests clarified:

"In case, they are not conforming to the norms, then against that industry orders for its closure are issued."

3.30 Elaborating further, the representative clarified:

" Yes, we have the authority to collect the sample. Besides, there are provisions in the Act, to issue directions and prosecution against such industry. Prosecution is primarily done at the level of the States."

3.31 Asked whether any action has been taken against industrialists and people for water pollution, the representative submitted as follows:

"As far as prosecution is concerned, hardly anybody has gone to jail. I have been to Uttar Pradesh; there I had a meeting with Uttar Pradesh Pollution Control Board, and they have made '*green bench'* wherein additional session of Lucknow is a judge who examine the cases. I have been told that 11 people have been sentenced punishment; they have made an appeal to the High Court, they have got stay. That is why, nobody has gone to jail till today. The system of prosecution is not being a success despite all efforts; this is why we are constituting National Environment Protection Authority in which we are planning to insert a provision for economic penalty and are working on it."

3.32 Noting that criminal prosecution for environmental offenders has not been successful in our country, the MoE&F further apprised the Committee during the evidence that they are presently working on economic instruments of regulation :

> "Till date, in our Environment (Protection) Act, there is a provision for punishment for levying only Rs.1 lakh, which we are going to increase. We have made a provision for levying Rs.20-25 crores as punishment in the National Green Tribunal. Thereafter, on it, the provision has been kept for levying the penalty of Rs.1 lakh per day. In punishment, the problem is that under criminal prosecution system, you go to court and make a complaint, then the matter is considered under Sessions Court, and thereafter, it goes to High Court; in this way, it is stretched to years and years."

3.33 The Committee note that the use of contaminated water had, in the recent past, led to loss of precious livestock, cultivable lands and even human lives in some parts of the country. Asked to comment on the matter, the representative of MoE&F informed the Committee during the evidence as follows :

> "The standards of drinking, potable water are notified by the Bureau of Indian Standards Act. Under BIS Act, implementation is regulated through the medium of Water Boards and Municipalities, and this falls under the Ministry of Urban Development."

3.34 The MoE&F further stated that their Ministry looks after ambient water rivers and lakes, and that drinking water comes under the purview of Ministry of Urban Development and it is governed by the standards of BIS. The standards of Ministry of Environment and Forests are for ambient water. Asked further as to what authority their Ministry has in the matter, the representative of MoEF stated during evidence as follows :

"Sir, actually environment is part of every Ministry. We, in Ministry of Environment also look very closely at the industrial pollution, and we do not look at these issues which are addressed by the concerned department."

3.35 When the Committee asked whether monitoring of ground water quality once a year is adequate to arrive at a comprehensive conclusion of water quality, the Ministry of Water Resources in a post-evidence reply stated:

"As per the World Meteorological Organisation's report titled 'Guide to Hydrological Practices', changes in ground water quality can be very slow and are often adequately described by monthly, seasonal or even annual sampling schedule. As a routine, the samples for ground water quality are collected from observation wells on annual basis. However, additional samples are also collected for undertaking specific studies."

3.36 Asked whether any discrepancy between data generated by CGWB and those generated by State Ground Water Organisations have been noticed while monitoring ground water regime, the Ministry furnished the following reply:

"No major discrepancy has been observed in the data generated by CGWB and State Ground Water Organisations. The monitoring data being generated by CGWB and State Ground Water Organisations are being integrated after inter-agency validation in which variations in the data caused by local geomorphic and hydrogeologic settings are reconciled."

3.37 The representative of the Ministry elaborated that:

"We have appointed a high level Task Force under the Chairmanship of Member, Central Water Commission to study the entire hydrological pattern. It is now in the process of submitting its recommendation."

3.38 When asked about the nature of coordination between Ministries of Agriculture, Environment and Forests and Water Resources in so far as safe use and withdrawal of ground water is concerned, the Ministry stated as under:

"Sharing of knowledge and information between the Ministries of Agriculture, Ministry of Environment and Forests and Ministry of Water Resources is a continuous process. Data related to ground water resources is exchanged on a regular basis with the Ministries mentioned, in the form of reports and maps. Coordination of activities between these ministries is also achieved through inter-ministerial committees on issues of common interest at appropriate levels.

Central Ground Water Board is a member of (i) Crop Weather Watch Group of Ministry of Agriculture (ii) Water Quality Assessment Authority of the Ministry of Environment and Forests (iii) Additional Expert Committee for Infrastructure Projects in the Ministry of Environment and Forests.

Similarly, Ministry of Agriculture/Ministry of Environment and Forests are members of the following Committees of the Ministry of Water Resources :

(i) Central Ground Water Authority
(ii) Central level Expert Group for overall assessment of ground water resources of India."

3.39 The Ministry also informed the Committee during evidence that the Ministries of Environment and Forests and Water Resources have come together and set up an authority called 'Water Quality Assessment Authority'. This was basically convergence mechanism. The Ministry further informed as under:-

"We have tried to activate this body since the last few years. We believe it needs more investment. Probably, we may have to go to Jal Board. It does not have that much of infrastructure as much it is expected. In this we have made a plan. In it, whatever is the investment of United Nations Environment Programme, we are making dialogue with other agencies also, it requires lot of investment. We require to have NABL accredition by upgradation of laboratories."

Use of satellite data

3.40 On being asked during the evidence whether it is working with ISRO to get the satellite images in order to ascertain the quality, quantity, level of depletion and replenishment of water bodies in the country, the Ministry stated as follows :

"Our assessment of ground water is going on in the country. It is already in the process. That is where we are working in tandem with the State administration. The Board (CGWB) has updated its methodology itself. Earlier we used to base our assessment on the data from the Survey of India maps, etc. Now, for the first time, they (Board) have decided to include all possible information including the satellite data. As far as ground water assessment is concerned, that is being done."

3.41 In a written reply wherein it was asked from the Ministry since when the services of satellite data have come to be utilized in monitoring ground water resources and whether the relevant information is shared with the stakeholders, the Ministry stated as follows :

"Remote sensing data has been used for selection of sites suitable for ground water exploration by CGWB since 1980s. With the launch of Indian Remote Sensing Satellite IRS-IA in March 1988, indigenous data became available for large scale mapping applications for various purposes. Since then, the services of satellite data generated by ISRO/NRSA are being used for various studies related to ground water. Remote sensing data is utilized in ground water studies for identification of areas suitable for ground water development and artificial recharge. The findings of various studies are being shared with user agencies/stakeholders on a regular basis."

3.42 Elaborating on the use of remote sensing data to works related to ground water, the Ministry in a written reply further stated that an important application of remote sensing is exploration of ground water. It helps in delineating the favourable / target areas for detailed ground-based hydrogeological and geophysical surveys for targeting sites for successful water wells. Remote sensing data commonly used for study on ground water are IRS data of various resolution and aerial photographs. The remote sensing data is presently used in the following works related to ground water.

(i) Preparing Hydrogeomorphological maps- different geomorphic units are delineated and their hydrogeological characteristics are studied and ground water potentiality and development prospects are assessed.

(ii) Demarcating lineaments in hard rock areas – identification of focused areas for geophysical and detailed hydrogeological study and to pinpoint suitable sites for drilling.

(iii) Delineation of water logged areas in surface water based canal command areas taken up for conjunctive use (of surface and ground water) studies.
(iv) Locating suitable areas for artificial recharge sites.
(v) Study of vulnerable areas of geogenic contamination viz., arsenic.

As the present status of knowledge in the arena of Remote Sensing goes, it is not possible to accurately work out the volume of recharge from different sources and ground water extraction from various aquifer systems over a period of time.

Tackling pollution of ground and surface water

3.43 There have been reports that excess use of fertilizers in agriculture is leading to ground water pollution in India. When the Committee asked the Ministry whether they are aware of such reports, the Ministry replied in the affirmative. Asked what remedial measures were being taken in this regard, the Ministry has stated that issues related to adverse impact of excess use of fertilizers/pesticides on ground water quality are discussed in mass awareness campaigns being organized by CGWB to sensitize the people.

3.44 Given the fact that the level of pollution in rivers/water bodies is increasing, the Ministry was asked whether any mechanism exist to control the pollution of rivers/water bodies in the country. To this the Ministry stated that all measures related to reducing pollution of rivers/water bodies in the country are being taken by the concerned State governments. Necessary support in this regard is provided to the States by the Ministry of Environment and Forests.

3.45 With regard to the measures being taken to contain river pollution, the Ministry in its post-evidence reply stated that the National River Conservation Directorate in the Ministry of Environment and Forests, Government of India is implementing a Centrally Sponsored Scheme, namely the National River Conservation Plan. The first River Action Plan, i.e. the Ganga Action Plan was taken up by MoE&F in 1985. Since then, its scope has been expanded to include all the

major rivers of the country. At present, the National River Conservation Plan (NRCP) covers 167 towns along polluted stretches of 38 rivers spread over 20 States. The objective of the Plan is to improve the water quality of major rivers in the country. The Central and State Pollution Control Boards have also initiated several measures for monitoring and taking necessary actions under the relevant Acts.

3.46 The Committee further asked the Ministry if any mechanism is in place to check pollution of ground water by industries who made structures for aquifer recharge but ended up discharging their polluted water in the aquifer, and what action was proposed to be taken against such industries. The reply of the Ministry to this query is as follows:

> "Section 10 of the Environment (Protection) Act, 1986 provide that any person empowered by Central Government shall have the right to entry and inspection, at all reasonable times with necessary assistance, to check infiltration of pollutants. CGWA has not been entrusted the powers under this section. However, CGWA has advised all the States to get the polluting industries inspected through District Collectors on a regular basis and submit a report to CGWA."

3.47 When the Committee asked about the inherent quality problems in ground water and the problem of sea water ingress affecting ground water development in aquifers in the coastal tracts in Gujarat, Kerala, Tamil Nadu, Andhra Pradesh and Orissa, the Ministry of Water Resources in a post-evidence reply stated as follows :

> "Inherent ground water quality problems are caused due to the presence of contaminants in the lithological units that constitute the aquifer systems.
>
> Sea water ingress into fresh water aquifers in coastal areas is caused by over-exploitation of ground water resources from aquifers in such areas, resulting in the development of landward hydraulic gradient.
>
> Solution to problems related to inherent quality problems include water supply from uncontaminated/alternate sources or through purification of water using suitable technology

before supply to public. In some cases, artificial recharge to ground water can also be used for quality remediation through the process of dilution in suitable areas. Inherent ground water quality problems could be tackled to some extent by mixing such waters with fresh water wherever possible. In multi-aquifer systems having both contaminated and fresh water zones, it may also be possible to isolate fresh water aquifers for ground water extraction through suitable well-construction techniques. Solution to the problem of sea water ingress lies in maintaining a seaward hydraulic gradient through regulation of ground water withdrawals in coastal areas or through augmenting the ground water in such areas through artificial recharge techniques."

Role of Central Ground Water Board

3.48 The Central Ground Water Board (CGWB), a multi-disciplinary scientific organization under the Ministry of Water Resources, is the apex National organization in the field of ground water in India. The CGWB came into existence under the Ministry of Agriculture with the renaming in 1970 of 'Exploratory Tubewells Organisation' (ETO), which was created in 1954 as a subordinate office under the then Ministry of Food, Agriculture, Community Development and Cooperation (Department of Agriculture) to carry out ground water exploration in the alluvial areas of the country, to delineate the regional aquifer systems and evaluate their yield potential. The Board is headed by a Chairman, of the level of Additional Secretary to the Government of India, and four other full time Members, equivalent to the rank of Joint Secretary to the Government of India, each manning the four wings of the CGWB, viz. Exploratory Drilling & Materials Management; Sustainable Management & Liaison; Survey, Assessment and Monitoring; and Training and Technology Transfer. In addition, there are other ex-officio-Members of the Board who are nominees of institutions in related fields of expertise. The ex-officio Members are :

1. The Joint Secretary (A), Ministry of Water Resources.
2. The Joint Secretary & Financial Adviser, Ministry of Water Resources.

3. The Joint Secretary, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
4. The Chief Engineer, IMO (WP&P), CWC, Sewa Bhawan, New Delhi.
5. The General Manager, ONGC, Ministry of Petroleum & Natural Gas, Dehradun.

The CGWB has 18 Regional Offices spread over different parts of the country, viz., Ahmedabad, Chandigarh, Lucknow, Chennai, Patna, Nagpur, Guwahati, Jammu, Hyderabad, Bhubaneshwar, Jaipur, Bhopal, Raipur, Bangalore, Kolkata, Thiruvanthapuram, Dehradun and Dharamshala.

3.49 The Central Ground Water Board is entrusted with the responsibility to develop and disseminate technologies, and monitor and implement national policies for the scientific and sustainable development and management of India's ground water resources including their exploration, assessment, conservation, augmentation protection from pollution and distribution based on principles of economic and ecological efficiency and equity.

3.50 The CGWB has been carrying out the monitoring of the country's ground water regime since 1969. The Board is presently monitoring ground water levels and quality on a regional scale through a network of 15,640 observation wells (piezometers) spread over the country. The observation wells comprise of dug wells owned by public as well as piezometers constructed by CGWB for monitoring purpose. The state-wise distribution of observation wells is given in table 3.50.

Table 3.50: State-wise distribution of observation wells (Piezometers) as on 31.03.2008

S. No.	States	No. of Observation Wells
	States	

1	Andhra Pradesh	981
2	Arunachal Pradesh	19
3	Assam	381
4	Bihar	373
5	Chattisgarh	516
6	Delhi	87
7	Goa	53
8	Gujarat	966
9	Haryana	426
10	Himachal Pradesh	85
11	Jammu & Kashmir	206
12	Jharkhand	208
13	Karnataka	1499
14	Kerala	864
15	Madhya Pradesh	1325
16	Maharashtra	1496
17	Manipur	25
18	Meghalya	38

Table 3.50 (Contd.)

19	Nagaland	17
20	Orissa	1214
21	Punjab	261
22	Rajasthan	1373
23	Tamil Nadu	906
24	Tripura	42
25	Uttar Pradesh	1218
26	Uttarakhand	44
27	West Bengal	909
	Union Territories	
1	Andaman & Nicobar	63
2	Chandigarh	16
3	Dadra & Nagar Haveli	10
4	Daman & Diu	4
5	Pondicherry	15
	Total	**15,640**

3.51 The ground water levels are monitored four times in a year while ground water quality is being monitored once in a year. Time series data generated by CGWB and the States are used in assessment of replenishable ground water resources in the country as well as categorization of assessment units based on decline in ground water levels and stage of ground water development. These form the basis for planning ground water development and management by the Central Government/States. In order to disseminate the ground water related data including point observations on water level and quality, a Web Enabled Ground Water Information System

(WEGWIS) has also been developed by CGWB in collaboration with National Informatics Center, New Delhi.

3.52 Regarding the frequency of monitoring carried out by the CGWB, the frequency of studies being conducted in areas where contamination is detected to ascertain the extent and causes of contamination and measures taken for arresting it, the Ministry gave the following reply :

> "Studies are being taken up at specific intervals. In certain areas where contamination is indicated or on request of State Governments, special studies are being carried out by CGWB to study the causes of contamination and to develop methods for controlling contamination or to locate alternate sources of contaminant free ground water."

3.53 On being asked whether any alerts or advisories are being issued to people in areas where contamination is detected, the Ministry replied as follows :

> "The findings of studies being taken up by CGWB are made available to Central Pollution Control Board, Ministry of Environment and Forests, States, etc. The information is also put on the web site of CGWB and on the Ground Water Information System. However, CGWB or CGWA does not issue any alerts or advisories."

3.54 Asked as to what extent the CGWB has achieved the objectives till date for which it was established, the Ministry in a post-evidence reply stated as follows :

> "Over the time, the Central Ground Water Board has carried out detailed studies with a view to map the ground water scenario for the country as a whole. Detailed district-wise reports have also been prepared for majority of the districts. The data collected by CGWB and the outcome of the analysis of such data in the form of technical reports etc. have helped State Government authorities and other stakeholders in planning for optimal and sustainable development and management of ground water resources."

3.55 When the Committee asked to name the organizations assisted by CGWB to solve their immediate water supply problem by selecting sites and areas for developing ground water supplies, the Ministry in a post-evidence reply stated as below:

> "Central Ground Water Board (CGWB) provides valuable assistance to various State Governments, Central Government and Public Undertakings in assessing the ground water reserves through exploration well etc. In addition, CGWB helps defence and paramilitary

establishments in the selection of sites for bore/tube/dug wells in the premises of Cantonments, Sainik Farms, CISF, BSF, Dundahera Military camp, CRPF, MES, DRDO, etc. in various parts of the country on priority basis as per request. Institutions such as the CPWD, NHPC, ITBP, CTR & TI, NEC campus, EPF Office, Agartala Gas Turbine Project, Vishwabharti, Shanti Niketan, Indian Institute of Science Education & Research, Railways, Ordnance Units, Nationalised Banks, Dairy Research Institutes, Comptroller & Auditor General offices, Women Hostels, National Police academies Cabinet Secretariat Institute, Public Health Engineering Departments, Irrigation Departments, Universities, Educational Institute, Power Grid Corporations, P&T Staff Quarters have been assisted."

3.56 As per the directives of Planning Commission, the CGWB is scrutinizing the major and medium irrigation projects/proposals sent by the State Govt./Central Water Commission/ CAD and Water Management Wing of Ministry of Agriculture from the point of view their impact on ground water regime and over specific recommendations are being made to protect quality and quantity of ground water. Upto 31st March 2009, 16 major irrigation project proposals of CWC were examined and area-specific recommendations were made against these projects. On being asked whether similar studies have been made in case of minor irrigation projects, the Ministry stated as follows:

"The Board does not receive project proposals on Minor Irrigation Schemes for observations/comments on impact of Minor Irrigation Schemes on ground water regime of the concerned area."

CHAPTER-IV

GOVERNMENT INITIATIVES FOR GROUND WATER AUGMENTATION

With the aim of tackling problems relating to depletion of ground water resources, Government of India has launched various initiatives for its long-term sustainability of the vital resource. These initiatives can be categorized into field demonstration/projects regulatory measures, IEC & other initiatives. These are described below in brief.

Ground Water Management and Regulation

4.2 The scheme for 'Ground Water Management and Regulation' is being implemented during 11th Plan with a financial outlay of Rs. 460 crores. The objectives of this Scheme are as under:

(a) Preparation of area specific Ground Water and Management plans;

(b) Ground Water exploration through exploratory drilling;

(c) Assessment of ground water resources and revise/update the methodology;

(d) Monitoring of ground water levels and quality;

(e) Develop/update area specific methodologies for area specific methodologies for ground water resources augmentation through demonstrative artificial recharge and rainwater harvesting studies;

(f) Regulate ground water development;

(g) Preparation of Reports, Map, Atlases and Brochures, etc. for use by planners, administrators and users;

(h) Updating of data storage and information system;

(i) Promote awareness and water quality consciousness;

(j) Develop linkages with scientific and related Institutions;

(k) Capacity building;

4.3 When asked as to what extent the objectives of Ground Water Management & Regulation Scheme have been achieved, the Ministry in a post-evidence reply stated as follows:

> "Activities taken up under the scheme have helped the states in planning scientific and sustainable development and management of ground water resources."

Artificial recharge of Ground Water through dugwells, Demonstrative Projects and Rain Water Harvesting

(i) Artificial Recharge of Ground Water through dugwells

4.4 Artificial recharge to ground water is another technique employed for prevention of ground water depletion. It aims at replenishment of ground water reservoir by utilizing surface runoff. Artificial recharge techniques normally help (i) enhance the sustainable yield in areas where over-exploitation has depleted the aquifer (ii) conservation and storage of excess surface water for future and (iii) improve the quality of existing ground water through dilution.

4.5 Giving a historical perspective on the practice of Artificial Recharge to ground water, the Ministry of Water Resources informed the Committee that artificial recharge is an age old practice undertaken in India to conserve rain water both on ground and underground. In the older days, the recharge movement initiated by the local communities was aided and supported by kings; chieftains; philanthropists and by those who valued water and practiced conservation. There are numerous examples and stone inscriptions from as early as 600 AD citing that ancient kings and other benevolent persons considered construction of small dug out ponds as one of their bounden duties to collect rain water and use it to recharge wells. Even today, thousands of such structures exist and are in use in the southern coastal towns and villages of Tamilnadu where underground water is saline. Other examples of water harvesting structures include *khadins*, tanks and *Nadis* in Rajasthan, *Bandharas* in Maharashtra, *Bundhis* in Madhya Pradesh, *ahars* and *pynes* in Bihar,

Kuhls in Himachal Pradesh, ponds in Kandi belt of Jammu & Kashmir, *Surangams* in Kerala, *Kattas* in Karnataka, and under ground tanks of Mizoram. The Ministry further stated that numerous big and small tanks and ponds are dotted all over the country and more so in the peninsular India. Many drinking water wells are located within the tank bed and on tank bund to provide water supply throughout the year with artificially recharged water from the tank water into these wells. In traditionally managed tank irrigation systems, when supply of water to tank is insufficient to raise a crop by gravity flow from tank, the village community decides to close all the tank sluices and allow the tank to act as percolation tank to continue the recharge of wells in the command area which then is shared by the beneficiary farmers.

4.6 The Ministry of Water Resources has, based on various studies conducted by CGWB, identified the suitability of artificial recharge structures broadly in different types of geological formations and topography as given in table 4.6.

Table 4.6: Topography and artificial recharge structures

Lithology	Topography	Type of structure
Alluvial or hard rock	Plain area or gently undulating area	Spreading pond, subsurface dike, minor irrigation tank, check dam, percolation tank or unlined canal system.
Hard rock down to 40 m depth	Valley slopes	Contour bunding or trenching
Hard Rock	Plateau regions	Recharge ponds
Alluvial or hard rock with confined aquifer to 40 m depth.	Plain or gently sloping of flood plains	Injection well or connector well
Hard rock	Foot hill zones	Farm ponds or recharge trenches
Hard rock or alluvium	Forest areas	Subsurface dykes

4.7 A state sector scheme of "Artificial Recharge of ground water through dug wells" has been launched by the Ministry in over-exploited, critical and semi-critical assessment units of 7 states, viz. Andhra Pradesh, Maharashtra, Karnataka, Rajasthan, Tamil Nadu, Gujarat and Madhya Pradesh to provide sustainability to the dug wells during the 11th Plan. The Scheme is being implemented in 1,180 blocks of these States on cluster approach basis in a time span of three years from 2007-10. The scheme aims to facilitate improvement in ground water situation in the affected areas, increase the sustainability of wells during lean period, improve quality of ground water and community involvement in water resource management in the affected areas. The average cost of recharge structure per well is Rs.4,000 and the total number of irrigation dug wells proposed for recharge is 4.45 million, of which 2.72 million are owned by small and marginal farmers and 1.73 million are owned by other farmers. Provision has been made for 100 per cent subsidy to small and marginal farmers and 50 per cent subsidy to other farmers, and Rs. 1,536.75 crores has been sanctioned for the scheme by the Ministry of Finance. A national level programme monitoring Committee has been constituted in the CGWB to review/monitor the progress of the scheme. When the Committee inquired whether the monitoring Committee has made any study of the physical and financial achievements of the scheme and with what results, the Ministry in a written reply informed that an amount of Rs.303.39 crores had been released against which Rs.274.13 has been utilized in respect of the Scheme upto 31.05.2011. The Ministry also informed the Committee during the evidence as under :

> "Physical and financial status of implementation of scheme is being monitored on monthly basis in terms of number of beneficiaries identified, opening of bank account, release of subsidy, number of beneficiaries (who) received subsidy in their bank accounts and construction of dug well recharge structures by the beneficiaries. A total of 7,72,249 beneficiaries have been issued subsidy."

4.8 The Committee wanted to know why this state sector scheme of artificial recharge was not introduced in other remaining states which are also facing water shortage. To this, the Ministry gave the following reply:

> "Areas underlain by hard rock aquifer have limited storage potentials and face the problem of depletion of ground water resources. Accordingly, the scheme has been implemented in the states of Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu which are predominantly underlain by consolidated rocks. About 80 percent of these ground water stressed areas (over-exploited, critical and semi-critical) are located in these states where rapid decline of ground water levels have been observed on long term basis."

4.9 To the question whether the scheme of artificial recharge to ground water through dug wells can be applied to drinking water too apart from irrigation purposes, the Ministry in a post-evidence reply stated as follows:

> "The scheme 'Artificial Recharge to Ground Water through dug wells' is meant for the existing dugwells in agricultural land of farmers. Yes, the techniques/concepts involved in roof-top rainwater harvesting can be applied to dug wells located near dwelling units which are used for drinking/domestic purpose. Proper chlorination of the water would be required prior to using it for drinking purpose."

4.10 The Central Ground Water Board has reportedly prepared and circulated Manuals and Guides on artificial recharge to ground water, which provide guidelines on investigation techniques for selection of sites, planning & design of artificial recharge structures, economic evaluation & monitoring of recharge facility. In addition, a concept report titled 'Master Plan for Artificial Recharge to Ground Water' has been prepared by the Board, which aims at providing area specific artificial recharge techniques to augment the ground water reservoir based on the twin important requirements of source water availability and capability of ground water reservoir to accommodate it, which has been said to be circulated to the States/UTs. The Master Plan is reportedly being updated in consultation with the State Government agencies.

(ii) Demonstrative Projects

4.11 It is also stated that the CGWB is carrying out demonstrative artificial recharge studies in high water demand areas with over-exploited/critical stage of ground water development. Artificial recharge studies have been completed in most of the Regions and impact assessment of ongoing and completed schemes, monitoring and report submission are in progress. During 2008-09, 191 artificial recharge structures have been completed by the Board.

4.12 Demonstrative projects on "Artificial Recharge to Ground Water and Rain Water Harvesting" have also been implemented by the CGWB during 2006-09 under the ongoing Central sector scheme of 'Ground Water Management & Regulation' in 8 identified areas of the States of Andhra Pradesh, Karnataka, Madhya Pradesh and Tamil Nadu. As on March 2010, out of 200 artificial recharge structures approved for implementation under the scheme at a cost of Rs.5,607 crores, 194 structures have been completed. The remaining 6 structures in the State of Karnataka are under progress. Asked whether there is any schedule to extend the artificial recharge scheme to remaining states apart from the above states, the Ministry in a post-evidence reply stated as under:

> "Central Ground Water Board has a target of 75 demonstrative artificial recharge projects for implementation at a total cost of Rs.100 crores under scheme 'Ground Water Management and Regulation' during 11th Plan. 14 Projects have since been sanctioned for 8 states."

(iii) Rain Water Harvesting

4.13 This is another method for augmentation and management of ground water resources. This technique involves collection of rainfall, either for direct use for drinking/domestic/irrigation or

diverted to underground aquifers through suitable techniques of artificial recharge for augmenting the ground water reservoir.

4.14 The Central Ground Water Authority (CGWA) has been constituted in January, 1997 under Section 3(3) of Environment (Protection) Act, 1986 for regulation of ground water development and management in the country. The Authority, functioning under the control of Ministry of Water Resources, is headed by the Chairman and 14 other members drawn from various Ministries/Departments/Organisations/Institutions of Government of India including all the 4 Members of CGWB. 5 additional members, one each from Department of Legislative, Department of Legal Affairs, Central Public Health & Environmental Engineering Organisation under Ministry of Urban Development, National Commission for women and Department of Drinking Water Supply under Ministry of Rural Development have been approved recently for inclusion in the composition of CGWB. The CGWB has been conferred with powers under Section 5 of the said Act for issuing directions, and also to resort to penal provisions under Sections 15 to 21 of the Act. It has also been authorized to appoint officers (Section 4) for carrying out its mandate. Accordingly, the Authority has issued directions to all Chief Secretaries of the States having 'over-exploited' areas to take necessary measures to promote/adopt artificial recharge to ground water/rain water harvesting. It has circulated the list of 839 over-exploited, 226 critical and 550 semi-critical assessment units to the State Pollution Control Boards, Bureau of Indian Standards (BIS) and Ministry of Environment and Forests for necessary action. It has also issued directions to Group Housing Societies, Institutes, Hotels, Industries, Farm Houses etc. in the notified areas of Delhi, Faridabad, Gurgaon, Ghaziabad and other areas of NCT Delhi where water table is below 8 metres from ground surface, to adopt roof top rain water harvesting system. Further, as part of

streamlining the regulatory function of Central Ground Water Authority, District Magistrates have been appointed as authorized officers for grant of permission for extraction of ground water for drinking/domestic uses in 43 blocks/talukas notified by CGWA in 10 States for ground water regulation. They have been advised to process request for grant of permission for extraction of ground water for drinking/domestic purposes in notified areas as per guidelines issued by CGWA. The CGWA has also framed revised guidelines for grant of NOC for ground water extraction by industries/projects in the country.

4.15 When asked about the responses of the States having 'over-exploited' areas regarding CGWA's initiative on adoption of rain water harvesting technique, the Ministry in a post-evidence reply informed the Committee that building by-laws have been amended in 18 States and 4 Union Territories (UTs) to make rain water harvesting mandatory. The details of status of enactment of roof top rain water harvesting in States and Union Territories are given in table 4.15.

Table 4.15: Status of enactment of roof top rain water harvesting in States/UTs

State	Year	RWH mandatory	Roof area/plot size	Building (Only New/all)	Penalty clause Yes/No if any	Area (Rural /Urban/Notified area)	Remarks
States							
1. Andhra Pradesh	2002	Mandatory	Plot /premises are of not less than 200 Sq.mt.	All	Yes	Notified urban area	State authority may get constructed RHW and recover the cost incurred along with penalty from the owner.
2. Bihar	2006	Mandatory	Plot area more than 1000 sq.m	All			
3. Goa	2002	Mandatory					The Goa Groundwater Regulation Act 2002 has already been enacted by the State Legislation on 25.01.2002 and come into force

							on 17.03.2003
4. Gujarat	2002	Mandatory	any size	Only New		Notified Metropolitan areas	The Dept. of Roads and Buildings have been directed to ensure that all major Govt. constructions including educational institutions had adequate RWH facilities.
5. Haryana	2002	Mandatory	---	--	--	Urban	--
6.Himachal Pradesh	2005	Mandatory	Plinth area more than 1000 sq. mt	Only new		Urban	
7. Karnataka	2009	Mandatory	More than 2400 sq. ft.	Only new		Urban and Rural	State has also extended help to the individual people also to the tune of 20% rebate on tax payment for 5 years duration. Rural Development and Panchyati Raj has issued orders for implementation of RWH in all govt. buildings and also in rural school.
8. Kerala	2004	Mandatory	--	Only New	--	Urban	--
9. Madhya Pradesh	2006	Mandatory	Plot size of more than 140 sq.mt	All	--		Govt. has announced 6 % rebate in property tax to individuals for the year in which the individual will go for installation of roof top RWH structures
10. Maharashtra	2002	Mandatory	More than 1000 sq. mt	Only New	--	Urban	--
11. Nagaland	--	Mandatory	--	New govt. building	--		--
12. Punjab		Mandatory	Plot of 200 sq. yds	All		Urban	Municipal corporation of Ludhiana and Jalandhar have framed Bye –laws to make RWH

							mandatory in new buildings
13. Rajasthan	2006	Mandatory	Plot area of more than 500 Sq. mt	All	Penalty like disconnection of water supply	Urban	--
14. Tamil Nadu	2003	Mandatory	All size	All	Disconnection of water supply and electricity	Rural and Urban	The state Govt. has achieved cent percent coverage in Roof Top Rain water harvesting by enacting the Ordinance.
15. Tripura	2004	Mandatory	Plinth area more than 300 Sq. m and Group housing of any size.	Only New		--	
16. Uttar Pradesh	--	Mandatory	Plots area of 100-200 sq.mt	All	--	---	--
17. Uttarrakhand	2003	Mandatory		All			
18. West Bengal	2007	Mandatory	---	--	--	--	--
Union Territories							
1. Chandigarh				All projects withdrawing of ground water in Capital area			

Table 4.15 (Contd.)

2. NCT Delhi	2001	Mandatory	Plot area 100 sq.m and above	Only New		Whole Delhi	To encourage RWH by RWA/GH societies Govt of NCT has launched a financial assistance scheme Bhagidari. Where 50% of the total cost of the project subject to a maximum Rs.50000/- ie being given to the RWAs as a grant
3. Daman & Diu	2002	--		All		Urban	Instructions have been issued to local PWD for construction of RTRWH structure
4. Puducherry	2002	--	--	Only New	--	Urban	--

4.16 Regarding the responses of Group Housing Societies, Institutes, Hotels, Industries, Farm Houses, etc. located in NCT Delhi and surrounding towns to adoption of rain water harvesting technique, the Ministry gave the following reply :

> "The response for adoption of rain water harvesting has been encouraging. Delhi Jal Board in NCT Delhi is providing assistance of 50 per cent of the cost up to Rs.1 lakh to Group Housing Societies, Resident Welfare Associations, Private/Recognised schools, institutional buildings, hospitals, charitable institutions to adopt rain water harvesting system. Financial assistance has also been approved in 206 cases. Registrar, Cooperative Societies have also advised Group Housing Societies to adopt rain water harvesting in their premises."

4.17 It is stated by the Ministry that a total of 299 training programmes have so far been conducted for capacity building of stakeholders in designing of rain water harvesting structures to augment ground water in different terrains and diverse hydrological conditions. Films produced by

Central Ground Water Authority on rain water harvesting in urban and rural areas, ground water pollution etc. are reportedly shown during mass awareness and training programme.

Farmers Participatory Action Research Programme (FPARP)

4.18 The Ministry of Water Resources has sanctioned 5,000 demonstrations under Farmers Participatory Action Research Programmes (FPARP) through 60 identified institutes in 25 States/UTs at a cost of Rs.24.4685 crores in the year 2007-08 with the objective of demonstrating the technologies available to the farmers for increasing productivity and profitability of agriculture. The FPARP is aimed at increasing water use efficiency in agriculture which, in turn, will result in reduced withdrawal of ground water and help prevent ground water decline. Once the technologies are replicated in large numbers, the efforts of FPARP will help in reducing/arresting the ground water decline in the long run. The Ministry further informed that 91.8 per cent of 5,000 demonstrations had been completed by the end of Kharif 2009, and 398 demonstrations were either completed or nearing completion during Rabi 2009-10.

4.19 Asked about the overall response of the farmers to FPARP programme, the Ministry in a post-evidence reply stated as follows ;

> "The performance of technologies under FPARP were compared with the conventional methods of cultivation/irrigation in terms of percentage increase in water saving, yield and income as a result of the programme. The farmers got benefited from increase in yields of various crops as well as reduction in quantum of water applied. The feedback from the farmers indicates that they are, in general, satisfied with the demonstration and are willing to adopt the technologies.
>
> The evaluation of the programme by external agencies has been initiated to assess the final outcome of the programme."

Role of Local Bodies in Ground Water Management

4.20 According to the Ministry, implementation of water conservation programmes used to be done by the Departments. Now they have changed the model of implementation. The roles of local bodies like the local panchayats and water users' associations (WUAs) are being emphasized. In Andhra Pradesh, for instance the WUAs are said to be playing fairly active roles in rejuvenating water bodies. The Ministry also stated in a post-evidence reply that it is promoting formation of WUAs through the Command Areas Development & Water Management Programme.

4.21 When asked to comment on the potential role of MREGS in replenishing the ground water levels, the Ministry replied as follows :

> "The National Rural Employment Guarantee Act (Mahatma Gandhi NREGA) notified on September 7, 2005, aims at enhancing livelihood security of households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. The Act covered all 619 rural districts of the country up to 2009-10 (200 districts in its first phase and 330 additional districts in second phase and all the remaining rural districts were notified with effect from 1st April 2008 marking Phase iii of the Act)."

The MGNREG Scheme includes following works related to water conservation:-

(i) Water conservation and water harvesting;

(ii) Drought proofing (including afforestation and tree plantation);

(iii) Irrigation canals including micro and minor irrigation works;

(iv) Provision of irrigation facility to land owned by households belonging to the Scheduled Castes and Scheduled Tribes or to land of beneficiaries of land reforms or that of the beneficiaries under the Indira Awas Yojana of the Government of India;

(v) Renovation of traditional water bodies including de-silting of tanks.

As informed by the Central Ground Water Board, the water conservation and water harvesting works include desilting of ponds, creation of ponds, and construction of rainwater harvesting/ artificial recharge structures. The water conservation works undertaken in the

MNREGS by construction of water harvesting and artificial recharge structures like check dams, village ponds, minor irrigation works, renovation of traditional water conservation structures etc. are beneficial for recharging and conserving the ground water as per local requirements. The augmentation of recharged water will lead to stabilization/ rising of water levels in the area. The involvement of local people for construction of these structures will also create awareness among them for conservation of water. The forestation and tree plantation for drought proofing indirectly increases the recharge to groundwater, because they create obstruction to the smooth flow of surface runoff. Slower movement of surface runoff means more time available for infiltration of water. A part of the infiltrate water percolates downwards to join the water table.

Construction of canal for micro and minor irrigation works leads to increase in the irrigation potential of projects and optimum utilization of water resources. A part of the canal water infiltrates downwards to recharge ground water, particularly if the canals are unlined and water levels are deep enough to absorb the infiltrated water. The infiltrated water from the wetted surface of the canals are loss from canals but they are gain to the ground water system through recharging.

Providing irrigation facility to land owned by households belonging to the Scheduled Castes and Scheduled Tribes or to land of beneficiaries of land reforms will also help in recharge underlying aquifers. Because a part of the water applied for irrigation will infiltrate downwards to improve the soil moisture, and a part will join the ground water system, which in turn will improve the groundwater scenario and raise the water level.

Traditional water harvesting structures, evolved and developed by our ancestors are time-tested structures. They have played and still playing important roles in different parts of India, under different climatic conditions, and various hydrogeologic frameworks, like alluvial areas, desert areas, crystalline formations, Deccan Traps, coastal aquifers etc.. The very basic aspect of the structures are collecting, storing and preserving water for various uses. With passage of time, the traditional structures were abandoned at many places or not given due importance. Revival of traditional structures is essential for conserving water and enhancing recharge to the underlying aquifers as they are time tested both in respect of design and locations.

One of the most important traditional water harvesting structures are tanks or ponds. It has been observed that due to silting in the pond (which are fine-grained mixed with organic matter), the infiltration capacity the formations at the bottom of the pond reduces creating an adverse impact on recharge to the ground water system. De-siltation work increases the water holding capacity of pond as well as the recharge capacity of ponds. Thus it helps in conserving more water and increasing in recharge.

CHAPTER - V

GOVERNMENT REGULATORY AND OTHER MEASURES

Advisory Council on Artificial Recharge of Ground Water

The Government of India constituted an Advisory Council on Artificial Recharge of Ground Water in the year 2006 under the Chairmanship of Hon'ble Minister (WR) and has members from concerned Central Ministries/Departments, representatives of State Governments, Public Undertakings, Financial Institutions, representatives of Industries and renowned subject Experts/Farmers/NGOs. The main objective of the Council is to popularize the concept of artificial recharge among stakeholders. The Council has held its meetings in July 2006, September 2007 and April 2010. The Council also constituted three sub-committees, which have prepared the following report/guidelines:

(a) 'More crop and income per drop of water,' has been prepared and released on 12 September, 2009.

(b) A web-enabled ground water information system was developed to disseminate data and information to various user Committee and launched on the occasion of World Water Day i.e. 22 March, 2010.

(c) Report on 'Policy for water for industries'.

Legislative Measures

5.2 Ministry of Water Resources has drafted and circulated the Model Bill to regulate and control development and management of ground water to the States / Union Territories (UTs). The model bill provides for setting up of Ground Water Authority in States / Union Territories to regulate and control development and management of ground water. The Authority will be vested with the

powers to notify areas for control / regulation of ground water extraction or use in any form and will perform related functions. The Authority may also identify areas worthy of artificial recharge, issue necessary guidelines for rain water harvesting and artificial recharge and give appropriate directions to the concerned departments in the State / UT to include rain water harvesting in all developmental schemes falling in notified areas. In urban areas falling in notified areas, the Authority may issue directives for construction of appropriate rain water harvesting structures in all residential, industrial and other premises having an area of 100 sq.m. or more. The Bill was initially circulated in 1970 which has been re-circulated in 1992, 1996 and 2005 for adoption. As per information received from States/UTs, so far 18 States and 4 UTs have already made roof top rain harvesting mandatory in their respective States/UTs. However 6 States, viz., Nagaland, Sikkim, Tripura, Manipur and Arunachal Pradesh and Punjab have not initiated action in this regard so far. The Committee asked the reasons for not initiating action in this regard by the six States, the Ministry in a post-evidence reply stated as follows:

> "Five States namely, Nagaland, Sikkim, Manipur, Arunachal Pradesh and Tripura have not initiated action for mandatory roof top rain water harvesting because none of the Blocks/Mandals/Talukas falling under these N.E. States are considered as either over-exploited or critical and also the level of ground water development is low. Punjab has already amended building by-laws making rain water harvesting mandatory."

5.3 When the Committee asked whether the Government proposed to take some specific initiatives to induce the 5 hold-out States opt for mandatory rain water harvesting, the Ministry replied as follows :

> "In respect of States in North Eastern region, no initiative is considered necessary as most part of these States are hilly regions and also the level of ground water development is low. However, the State of Arunachal Pradesh is implementing demonstrative project on Artificial Recharge to Ground Water and Rain Water Harvesting under Central Sector Scheme titled 'Ground Water Management and Regulation' during the Eleventh Plan."

5.4 Enquired about the action taken by the Ministry to ensure that the directions of CGWA are complied with by States and private bodies, the Ministry in a post- evidence reply stated as below:

> "The Central Ground Water Authority has been constituted under the directions of Hon'ble Supreme Court of India by MoEF under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 with delegated powers to give directions under section 5 of the said Act. Non-compliance of directions issued under section 5 of the said Act makes it punishable offence under the provisions of section 15 of the said Act. Courts of local jurisdiction are empowered to take cognizance of such offences upon a complaint as per the provisions of section 19 of the said Act. Ministry of Water Resources proposes to follow up the matter with local bodies like Delhi Development Authority, Municipal Corporation of Delhi, New Delhi Municipal Council, Resident Welfare Association, etc."

Repair, Renovation and Restoration of Water Bodies

5.5 The Ministry have stated that there are 5,56,601 water bodies identified in course of minor irrigation census (2005) in the country. The State-wise details of water bodies in the country are given at **Appendix-I**. The Government of India in January 2005 sanctioned a pilot scheme called 'National Project for Repair, Renovation and Restoration' (RRR) of Water Bodies directly linked to Agriculture' with an estimated cost of Rs. 300 crores to be shared by the Centre and the States in ratio of 3:1**.** The objective of the scheme was to restore and augment storage capacities of water bodies, and to recover and extend their lost irrigation potential. The Ministry informed that the activities in respect of this scheme were to be completed by the end of the 10th Five Years Plan period. The details of release of funds under the pilot scheme are given in **Appendix-II.**

The Ministry further elaborated that the Ministry of Environment and Forests is also implementing the scheme of National Lake Conservation Plan since June 2001 for conservation and management of polluted and degraded lakes in urban and semi-urban areas of the country where degradation is primarily on account of discharge of waste water into them, through an integrated

ecosystem approach. When asked the achievements made under the pilot scheme in terms of expenses incurred and the number of projects launched, the Ministry of Water Resources explained as under:

> "The scheme had an outlay of Rs. 300 crores with Rs. 225 crores as Centre share. Total number of 1,098 schemes with an estimated amount of Rs. 299.91 crores were approved. Works have been completed in 1,054 water bodies and works in 13 water bodies have been dropped. Work is in progress in 31 water bodies in the State of Maharashtra due to late approval.
>
> Evaluation reports received from Water Technology Centre, Bhubaneshwar, Water and Land Management and Research Institute, Hyderabad and Centre for Water Resources Development and Management, Kozhikode, Kerala indicate considerable increase in storage capacities of water bodies as well as increase in agricultural productivity in their command areas."

5.6 Asked if the pilot scheme of Repair, Renovation and Restoration of Water Bodies has boosted the efforts for augmentation of ground water resources in the country, the Ministry in a post-evidence reply stated as follows:

> "The scheme of RRR of water bodies envisages comprehensive improvement of water bodies, catchment area treatment, command area development and capacity building of stakeholders, and is expected to increase availability of water for recharge and consequent augumentation of ground water resources."

5.7 The representative of the Ministry also informed the Committee in his oral testimony that a programme for rejuvenation of water bodies has been started since the year 2009 with the assistance of the World Bank. Projects have been taken up in Andhra Pradesh, Karnataka, Tamil Nadu and Orissa. The first instalment of the assistance has been released to the States of Karnataka and Orissa.

5.8 The Committee were informed that roughly Rs.20,000 crore is going under the MGNREGS towards water conservation programmes. The Ministry has suggested if the Panchayat is not in a position to take up the job, if the Water Users Association is more active, let it come forward and

do this job of rejuvenating the water body. The Ministry further informed the Committee that it is investing about 10 per cent of the project money for capacity building itself, wherever it has not happened as yet. The Ministry also informed that 5 per cent of the project cost goes for independent monitoring and feedback.

5.9 When queried what results have been achieved by investing 5 per cent of project cost for independent monitoring of projects intended for renovation, conservation and replenishment of water bodies, the Ministry informed the Committee during evidence:

> "Sanction has been released in the last week of March in the context of water bodies, independent monitoring process has started. As for projects related under NAREGA, it will be looked after by Rural Development Ministry. 5 per cent money has been kept for monitoring."

5.10 Asked further about details of the monitoring regime established for water bodies conservation, the representative of the Ministry informed the Committee as under:

> "I am stating that it (monitoring) is done through State administration, we have decentralized all the powers of sanction, and we released the funds from Central level. The district collector is the head of the monitoring committee; when the district administration will implement it, he will supervise it. Then, there is a State-level committee whose head is Principal Secretary to State Government."

5.11 When the Committee suggested for random checking of implementation of schemes meant for water conservation in the country, the representative informed that their Ministry has a provision of random checking, and assured that though the country has 28 States, still random checking will be done at district level.

Geophysical Studies

5.12 The Ministry also stated that the CGWB undertakes geophysical studies as an integral part of its activities to support and supplement ground water management studies, ground water

exploration and other related work. During annual plan 2008-09, upto 31st March 2009, a total of 1,932 Vertical Electrical Soundings, 10.88 line kilometer resistively profiling and geophysical logging of 88 bore holes have been conducted in different parts of India. Asked about the significance of geophysical studies in preventing depletion of ground water resources, the Ministry stated in a post-evidence reply as follows:

> "Geophysical studies are useful tools for supplementing information collected through various scientific investigations aimed at management of ground water resources with the objective of preventing depletion of ground water resources. Such studies provide vital inputs for ground water management studies, selection of sites for drilling of bore/tube wells, identification of areas suitable for construction of artificial recharge structure and also for demarcation of areas having saline ground water, either inherent, or due to saline water ingress ."

5.13 The Ministry informed the Committee that geophysical studies have been conducted by CGWB in parts of the states of the country. These studies have helped in delineation of potential ground water bearing zones, ground water quality and potential areas for artificial recharge to ground water in different geological formations. Geophysical logging studies have been conducted by the Board in the States of Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal having unconsolidated formation. The studies have helped in firming up the well assembly in exploratory bore holes in unconsolidated formations drilled as part of ground water exploration programme of CGWB.

Development of Water Resources Information System

5.14 The Committee were informed that the Government has taken up a new Plan scheme called Development of Water Resources Information System (WRIS) in the 11th Plan w.e.f 2007 which aims to develop information system on water resources at the national level. The total

allocation for the 11th Plan period (2007-12) for setting up of Data Bank and Data Collection activities is Rs. 234.3 crores. The Ministry in a written reply informed the Committee that the first phase of WRIS was inaugurated by the Ministry of Water Resources on 7 December 2010. The Project is scheduled to be completed by December 2012. The Central Water Commission and ISRO have signed an MoU on 3 December 2008 to develop web enabled GIS based Water Resources Information System for the entire country during the 11th Plan to be completed in four years. This system will include information for all the States.

5.15 The Ministry informed that the CGWB has developed a "Web-enabled Ground Water Information System (WEGWIS)" which provides a solution to the decision makers for formulating, monitoring macro/micro level schemes, etc. for the users of water sector. The WEGWIS comprises the spatial database infrastructure connected through Internet/Intranet. The system has been developed to provide a unified internet based access to water related information (spatial/non-spatial) for policy planning and management. The WEGWIS is a Web GIS service which provides a functional internet based platform for accessing water related maps and data for decision making and planning. The information available would be disseminated as per the map restriction policy of Government of India. An amount of Rs. 85 lakhs has been spent for the development of Ground Water Information System.

Public Awareness Programmes and Awards

5.16 The Committee were informed that the Ministry of Water Resources has instituted annual awards, namely 'Ground Water Augmentation Awards' (Bhoomijal Samvardhan Puraskar) and 'National Water Award' in 2007. The awards aim to encourage the non-Governmental Organisations (NGOs)/Gram Panchayats/Urban Local Bodies (for population upto 1 lakh)/

Institutions/Corporate Sector and individuals for adopting innovative practices of ground water augmentation by rain water harvesting and artificial recharge, promoting water use efficiency, recycling and re-use of water and creating awareness through peoples' participation in the targeted areas resulting in the sustainability of ground water resources. There are 21 Ground Water Augmentation Awards for all categories taken together consisting of a cash award of Rs. 1 lakh and a plaque with citation, while the National Water Award consists of a cash award of Rs.10 lakhs and a plaque with citation.

In addition, the Central Ground Water Board has reportedly conducted 384 mass awareness campaigns on Rain Water Harvesting and Artificial Recharge of ground water throughout the country involving Central/State/NGOs, VOs, Resident Welfare Organisations, Educational Institutions, Industries and Individuals.

5.17 The Ministry also informed the Committee during the evidence that, in addition to Web-Enabled Ground Water Information System (WEGWIS), the Ministry of Information Technology also has a scheme. The representative deposed:

> "They (Ministry of Information Technology) are installing IT Kiosks in all big villages of the country. We are going to integrate with them. Our effort is to make available information regarding underground water in local language along with pictures. The villagers, on seeing such pictures, would get an idea that if they use the water under their tube-wells with this frequency, in years to come there will be left no water. I believe that, with this, people would start worrying on this issue as water is used more in private sector."

5.18 Elaborating on steps taken by them for creating awareness on ground water recharge, rain harvesting, efficient water utilization etc., the Ministry further stated during the evidence as follows :

> "In case any 'sarpunch' is planning to prepare for it, then it is necessary to give him this awareness. To give awareness on this issue, which is on job, for this, we will encourage Kiosks as developed by the IT Ministry, because there is a limit to our manpower. In every district, we have attached one scientist with a collector. This is not visible because some of

the scientists are entrusted with 4 or 5 districts. We do not have large number of scientists. That is why, we have a plan for restructuring of the Board. With the help of the Government and you (Committee), we will try to put in every district necessarily one Scientist, who will collectively plan with District Magistrate on the Ground water Recharge, National Management and Regulation, and work shoulder to shoulder with them. Will go to the Panchayat and will work for better use of IT Kiosks."

5.19 The Ministry also *inter-alia* informed further as under:-

"We have uploaded on the website the information on techniques of ground water but these are not adequate, because all do not have access to the website. We have circulated to all the States to circulate it to all the Districts. But that is also not sufficient. Now we will give guidelines to the scientist who is in the district, to make the people of their district aware on this. Besides, will also arrange for programme on the All India Radio."

5.20 When it was pointed out during evidence that the services of AIR and newspapers are not always dependable in the villages, the Ministry made the following suggestions :

"That is a very valid point. In this we can do what is being started in U.P., they have started the system of celebrating 'Tehsil Divas' and 'Thana Divas'. We can advise our scientists to make more and more people aware as when they get time, once a week or twice or more."

Water as subject under Union List

5.21 The Committee note that almost in every village and in every panchayat there is water crisis. India is going to face one of the biggest crises. It is not the food crisis or the population crisis, but it is the water crisis which is going to overwhelm us. Water is a scarce and precious resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the States. The Committee were informed by Ministry that States are having a lot of feuds on issue of water. The Ministry tries to resolve the dispute as per the existing mechanism, still are unable to resolve the disputes among the States. Asked to comment on the desirability of effecting constitutional

amendment with regard to 'water' which figures in the State List (entry 17), Seventh Schedule to the Constitution, the representative deposed:

> "It (water) should be brought under the Union List; if not in the Union List, atleast in the Concurrent List."

PART-II

OBSERVATIONS AND RECOMMENDATIONS

1. The Committee, while recognizing the fact that water is a scarce and valuable resource, note that the country possesses an estimated 1,123 billion cubic meters (bcm) of utilizable water per year. Unfortunately, the share of replenishable ground water is only 433 bcm and only 58 per cent of the total replenishable ground water is being utilized for various purposes. Over 80 per cent of India's rural domestic water requirement and about 50 per cent of its urban and industrial water needs are being met from ground water sources. In addition, approximately 45 per cent of created irrigation potential in the country is through exploitation of ground water resources. However, the development of ground water in different areas of the country is highly uneven. While ground water exploitation is very high in western, north-western and southern parts of the country covering the States of Rajasthan, Haryana, Punjab, western Uttar Pradesh, Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu, the level of ground water exploitation in States like eastern Uttar Pradesh, Bihar, West Bengal, most parts of Orissa and entire North-east is very low. The Committee also note that the sub-optimal development of ground water in Assam (North-east), Bihar, West Bengal and parts of Uttar Pradesh as compared to Haryana, Punjab and western Uttar Pradesh is attributed to availability of surface water resources, coupled with socio-economic factors like fragmented land holdings, lack of adequate infrastructural facilities and financial condition of majority of farmers. However, the Ministry quoting the Report 'Food Security, Water and Energy Nexus' of the National Rainfed Area Authority, Ministry of Agriculture, find that "puddle rice cultivation is the main culprit of excessive exploitation of

ground water in north-west India and hence decline in ground water table". The Committee note with grave concern the alarming trends in the last few decades of indiscriminate exploitation of ground water resources for domestic, irrigation and industrial uses and also due to vast urbanization which have resulted in depletion of level of limited ground water resources in certain parts of India. They also note that as per the analysis made by the Ministry on ground water levels during May 2009, as compared with the mean water levels of the previous decade (May 1999-May 2008), ground water levels have shown a decline in about 55 per cent of observation wells during the period. Further, fall in water level of more than 2 meters on long term basis has been observed in areas like parts of Madhya Pradesh, Uttar Pradesh, Gujarat, eastern Rajasthan, Haryana, Punjab and eastern Maharashtra. According to the Report of Central Ground Water Board, as on March 2004, against availability of ground water of 0.28 bcm, withdrawal for irrigation, domestic and industrial use is being made annually to the tune of 0.48 bcm. in NCT Delhi. Out of 9 zones in Delhi, only 2 are safe zones, while the remaining 7 were reported to be over-exploited ones in terms of ground water development. Observations made by CGWA on 197 wells in regard to changes in the past 10 years, i.e. between January 2000 and January 2009, reportedly reveals that ground water levels registered a fall in 143 wells as against rise noticed in only 54 wells. Fortunately, ground water which occurs in a variety of geological formations across the country, is a replenishable resource. Rainfall is the principal source of recharge to ground water followed by canals, irrigated fields and water bodies as other sources of recharge. Taking note of the indiscriminate over-exploitation of ground water and alarming fall in the water table particularly in certain areas, the Committee strongly urge the

Government for immediate and comprehensive groundwater resource planning, development and management on a long term basis. The exploitation of ground water resources be so regulated as not to exceed the recharging capacities of the underground aquifers in particular aquifer zones and ground water recharge projects be developed and effectively implemented by the Government for improving both the quality and quantity of scarce ground water resource.

2. The Committee further observe that withdrawal of ground water in excess of natural recharge capacity has caused decline in ground water table in some parts of the country, as also did other contributory factors such as (i) increasing demand of ground water for agriculture, industrial and drinking purposes,(ii) change in cropping pattern and growing of paddy and cash crops that consume large quantities of water, (iii) flat rate/free electricity to farmers for extracting water in certain States, (iv) rapid pace of urbanization resulting in reduced natural recharge to aquifers and (v) scanty rainfall in arid and semi-arid regions. Noting that the exploitation of water being a State subject under the constitutional set-up, the Committee call upon the Ministry to induce all the States to adopt an appropriate and uniform regulatory mechanism to curb wasteful, excessive withdrawal of ground water by water-users such as farmers, industries, etc. The Committee would also like to caution that flat rate/free electricity granted by some State Governments for extracting ground water will lead to indiscriminate exploitation and water scarcity in the long run. The Committee also recommend that ground water exploitation be regulated judiciously by involvement of local bodies like panchayats and Water User Associations (WUAs) and the need for building strong public awareness for water harvesting, conservation and sustainable exploitation.

3. The Committee are seriously concerned that India's initial National Communication to United Nations Framework and Convention on Climate Change (NATCOM, 2004) submitted by the Ministry of Environment and Forests projects a very gloomy future scenario about the impact of climate change on water availability in the country. The report has predicted that climate change is likely to adversely affect the water balance in different parts of India due to changes in precipitation and evapotranspiration and rising sea levels, leading to increased saline intrusion into coastal and island aquifers. Increased frequency and severity of floods is expected to affect ground water quality in alluvial aquifers, while increased rainfall intensity may lead to higher runoff and the possibility of reduced recharge. Fully aware of the threat posed by the reality of global climate change, the Committee desire the Ministry to devise a long term action plan in consultation with other associated Ministries such as Agriculture, Environment and Forests, Industry and Commerce and Science and Technology to meet this challenge so that its adverse affect on the country's water resources is minimized to the extent possible. The Committee also recommend that the Government explore application of water saving techniques, viz. rotational cropping system, drip and sprinkler irrigation and ground water recharge method in areas where traditional canal irrigation holds sway, so that the country's limited ground water resources do not go waste.

4. The Committee are concerned to note the sea water ingress into fresh water aquifers in coastal areas in Gujarat, Kerala, Tamil Nadu, Andhra Pradesh and Orissa is causing severe constraints in ground water development. The Committee observe that some models of artificial recharge and ground water management have been successfully

employed outside India. For example, in Arizona (U.S.A.), the problem of over-exploitation and falling water levels is addressed by law that mandates balancing abstraction with recharge, and Ground water Code (1980) has been enacted to meet this challenge. Similarly, Oman has adopted a successful strategy for sustainable ground water management which include obligatory registration of all wells, introduction of well permits, national well inventory, well metering, improving irrigation techniques, public awareness campaigns for water conservation, etc. on *demand side,* while the *supply side* measures include large recharge dams. The Committee, therefore, recommend the Government to explore earnestly the viability of replicating such models of artificial recharge/ground water management in India so that positive and tangible improvements are made on ground water front in the near future. The Committee also calls upon the Ministry to be on the lookout always as to what measures have been initiated in this direction.

5. The Committee note that the quality of ground water resources in the country is another crucial aspect that demands earnest consideration and stringent monitoring on a continual basis. The Central Ground Water Board (CGWB) monitors the quality and level of ground water through a network of 15,640 observation wells (Piezometers) in addition to the efforts of the State ground water organizations. Empirical observations show the presence of fluoride in ground water in excess of maximum permissible limit of 1.5 mg/l as prescribed by the Bureau of Indian Standards (BIS) in as many as 227 districts of the country. The situation in respect of other harmful chemical constituents like arsenic, nitrate, iron and also inherent salinity (electrical conductance) which are collectively termed *geogenic contaminants* is reportedly alarming in certain agricultural belts. The Committee note that

there are 1,79,999 habitations in the country having water problems associated with fluoride, arsenic, iron, salinity and nitrate. Fluoride is present in 33,363, arsenic in 9,504, iron in 11,872 , salinity in 32,689 and nitrate in 2,571 habitations of the country. This is over and above the hazard posed by *anthropogenic/ man-made contaminants* such as manganese, lead, chromium, cadmium, etc. in ground water in some parts of the country, resulting from mining activities or seepage from untreated industrial wastes. Further, the growing construction of septic tanks for want of sewer lines in the countryside has become another possible source of sub-soil contamination. The Committee, therefore, recommend that appropriate action be initiated to deal with the situation. The Committee are shocked to learn that some industries in the name of aquifer recharge, made structures for aquifer recharge, but actually ended up discharging the polluted water to the aquifer below the ground. They are also deeply dismayed that the Ministry of Environment and Forests have no schemes to tackle this problem of ground water contamination. The Committee, therefore, urge the Government to bring out a comprehensive national plan after due consultation with the concerned Ministries for containing the alarming trend of ground water contamination in the country so as to ensure supply of safe drinking water for the present as well as future generation. They would also like to be apprised of the action taken by the Government in this matter at the earliest. The Committee would also like to know the break-up of contaminated habitations indicating the nature of contamination state-wise.

6. The Committee observe that apart from the ground water, the pollution of surface water bodies like rivers is another grave menace for the simple fact that pollution of rivers

can adversely affect the quality of ground water in aquifers hydraulically connected with them due to percolation. The Committee are perturbed to note that as much as 33 per cent of the stretches out of the total 45,019 km. of length of rivers in India are polluted. The Committee are also concerned to learn that the water quality samples analysed by the Central Water Commission on major rivers of the country indicated that river water pollution has increased over the years and more stretches of rivers are getting polluted due to increased urbanization, increase in industrial activities and use of more material resources by the population in general. Further, as reported by the Ministry, as on 01.04.2009, there are about 1.80 lakh quality affected habitations in the rural areas with different types of contamination. The scenario obtaining on the water pollution front in the country is indeed lurid and increasingly worrisome. The Committee note with grave concern that the use of contaminated water had, in the recent past, led to loss of precious livestock, cultivable land and even human lives in some parts of the country. Since pollution in ground as well as surface water bodies is inter-connected and surface water pollution is steadily increasing over the years, there is an immediate need to tackle effectively surface water/river pollution and ground water pollution and depletion as well. The Committee, therefore, strongly recommend that Government of India evolve expeditiously some innovative mechanism to keep tab on the efforts of State Governments as well as concerned Central Pollution Control agencies to ensure a harmonious and effective coordination among them in order to tackle the problem of water pollution and depletion lock, stock and barrel within a speedy time frame.

7. The Committee note that a major factor causing pollution to the rivers in India is the discharge of untreated sewage in the rivers. However, reportedly the capacity to generate sewage treatment in the country is only 30 per cent and the remainder 70 per cent sewage is discharged untreated. The Committee note that the measures relating to reducing pollution of rivers/water bodies in the country are being taken by the concerned State Governments with some support by the Ministry of Environment and Forests. Distressingly, the Central sector schemes like Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns as well as State sector schemes, run by municipalities have failed to deliver despite huge investments being made in them due to many problems including operational and maintenance issues, problems in power supply, etc. The Committee are of the considered view that environment is part of every Ministry and that pollution of rivers/water bodies also involves convergence of activities of several Ministries such as Water Resources, Environment and Forests, Agriculture and still others. The Committee, therefore, underline the need for greater interaction and sharing of knowledge and data among the Ministries of Water Resources, Agriculture, Environment and Forests and others in a continuous process. The Committee ardently hope and expect that the process of exchange of data on ground water resources and the coordination of activities among the Ministries concerned will continue and lead to tangible outcomes in redressing the problem of water pollution through their sustained, innovative and integrated efforts. The Committee also note that the Ministries of Environment and Forests and Water Resources have collectively set up a convergence mechanism in the form of an authority called 'Water Quality Assessment Authority' for

which efforts are being made to get investments under UN Environment Programme and other agencies. The Committee hope that the efforts for concretizing 'Water Quality Assessment Authority' would bear fruits and results would become visible on the water quality monitoring front in the near future. The Committee desire to have updated information as to the remedial action taken in the matter.

8. The Committee observe that in some parts of the country, especially eastern Uttar Pradesh polluted water from sugar factories and distilleries greatly affected the quality of ground water to the extent that it gives a reddish colour to the water. However, no case of punishment awarded to water polluters or environmental offenders in the country has been brought to the notice of the Committee. According to the Ministry, the main responsibility for implementation of the Environment (Protection) Act, 1986 is of the State Pollution Control Boards. Admittedly, the State Pollution Control Boards have not been able to perform their jobs for various reasons. Further, role of the Central Pollution Control Board is only to give technical advice and overall guidance to the State Pollution Control Boards. The representative of Ministry of Environment and Forests informed the Committee that their role in prevention of pollution by industries is confined only to the giving of environmental clearance for new industries, viz. before a new industry or an infrastructural project is established, environmental clearance is given by the Ministry of Environment and Forests. The Committee note that Section 10 of the Environment (Protection) Act, 1986 provides that any person empowered by the Union Government shall have the right to entry and inspection, at all reasonable times with necessary assistance, to check infiltration of pollutants. Further, the Central Ground Water Authority (CGWA) has also advised all the

States to get the polluting industries inspected through District Collectors on a regular basis and submit a report to them. The Committee are, therefore, optimistic that, given the sense of commitment and credibility of inspecting officers, there is good scope even under the present arrangement for the Union Government to curb industrial pollution. The Committee, therefore, recommend the Government to pull up its socks and attempt to get existing pollution control laws enforced strictly by concerned bodies such as Central Pollution Control Board, Central Ground Water Authority and by the State Governments. They also desire the Government to tone up the functioning of these bodies by calling for biennial reports on the status of pollution levels of rivers and water bodies located all over the country, and also by insisting on regular inspection of factories, including tanneries located in high-pollution areas/zones like Kanpur in Uttar Pradesh by the Central Pollution Control Board and District Collectors and submission of their findings to CGWA at least twice a year. The Committee would like to be informed of the steps taken by the Ministry in this regard.

9. The Committee note that the Government has taken up a new Plan Scheme called Development of Water Resources Information System (WRIS) in the Eleventh Plan for developing information system on water resources at the national level. The first phase of WRIS was inaugurated by the Ministry of Water Resources on 7 December 2010 and the project is scheduled to be completed by December 2012. The Committee desire the WRIS be completed by the scheduled date positively. The Committee further note that the CGWB has developed a 'Web-enabled Ground Water Information System (WEGWIS) in collaboration with NIC, which aims at providing a unified internet-based access to water

related information (spatial/non-spatial) for policy planning and management. The Committee recognize the potential value of WEGWIS for effective management of our precious ground water resources, and desire the Ministry to get the data and information on this system updated regularly so that the policy-makers, decision-makers, and the public at large benefit from this advanced modern web-enabled information system.

10. The Committee observe that the Government has put into use satellite data generated by ISRO/NRSA for various studies related to ground water, including identification of areas suitable for ground water development and artificial recharge and that the findings of various studies are being shared with user agencies/stakeholders on a regular basis. The remote sensing data are reportedly being used in these works related to ground water: (i) preparing hydrogeomorphological maps whereby geomorphic units are delineated and their hydrogeological characteristics are studied and ground water potentiality and development prospects are assessed, (ii) demarcating lineaments in hard work area, which include identification of focused area for geophysical and detailed hydrogeological study and to pinpoint suitable sites for drilling, (iii) delineation of water logged areas in surface water based canal command areas taken up for conjunctive use (surface and ground water) studies, (iv) locating suitable areas for artificial recharge sites and (v) study of vulnerable areas of geogenic or arsenic contamination. The Committee recommend that the Ministry evolve an institutional mechanism to channelize the regular flow of remote sensing data to user agencies/stakeholders and apprise the Committee of the feedback received from user agencies/stakeholders within six months of the presentation of the report.

11. The Committee note that a high-level Task Force under the chairmanship of Member, CWC has been appointed to study the entire hydrological pattern of the country, and its recommendations are to be submitted shortly. The Committee would like to be apprised of the main highlights of the report of this Task Force as and when it is received by the Ministry.

12. The Committee also note that geophysical studies have been conducted by CGWB in several parts of the States of the country to support and supplement ground water management studies, ground water exploration and other related works. Upto 31 March 2009, geophysical logging of 88 bore holes had been conducted by the CGWB in the States of Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal having consolidated geological formations. The Committee observe such geophysical studies provide vital inputs for ground water management studies, selection of sites for drilling of bore/tube wells, identification of areas suitable for construction of artificial recharge structure and for demarcation of areas having saline ground water, either inherent, or due to saline water ingress. Noting the significance of such studies for monitoring, management, utilization and preservation of ground water in the country, the Committee earnestly urge the Ministry to extend geophysical studies to the remaining States wherever possibilities exist. The Committee would like to be apprised of the follow-up action taken by the Ministry in the matter in course of time.

13. The Committee recognize artificial recharge to ground water as a key method for conservation and management of ground water. This technique is being employed (i) to enhance sustainable yield in areas affected by depleted aquifer due to over-exploitation; (ii)

for conservation and storage of excess surface water for future; and (iii) to improve the quality of existing ground water through dilution. The Committee note that the CGWB is carrying out demonstrative artificial recharge studies in high water demand areas with over-exploited/critical storage of ground water development, and that demonstrative projects on artificial recharge to ground water have been implemented by the CGWB during 2006-09 under the ongoing Central Sector Scheme called 'Ground Water Management & Regulation' in 8 identified areas of the States of Andhra Pradesh, Karnataka, Madhya Pradesh and Tamil Nadu. As of March 2010, out of 200 artificial recharge structures approved for implementation under the scheme at a cost of Rs. 5.607 crores, 194 structures had been completed. The remaining 6 structures in the State of Karnataka are reportedly in progress. The Committee also note that the CGWB has set a target of 75 demonstrative artificial recharge projects for implementation apart from the above States at a total cost of Rs.100 crore under the same scheme during the 11th Plan, and for which 14 projects were said to have been sanctioned for 8 States. The Committee feel that the Government should extend the Scheme to other areas facing critical ground water levels, such as Bundelkhand region of Uttar Pradesh and Madhya Pradesh. The Committee also expect the CGWB to meet its goal for completion of 75 demonstrative artificial recharge projects during the 11th Plan. The Committee would like to be informed of the progress made in this matter at the earliest. Also, the status of six projects already in progress be intimated to the Committee.

14. The Committee note that the Government has launched a State sector scheme of artificial recharge of ground water through dug wells in over-exploited, critical and semi-critical assessment units of 7 States viz. Andhra Pradesh Maharashtra, Karnataka,

Rajasthan, Tamil Nadu, Gujarat and Madhya Pradesh during the 11th Plan. The scheme was to be implemented in 1,180 blocks of these States in a time span of three years from 2007 to 2010 with the objective to facilitate improvement in ground water situation in the affected areas, increase the sustainability of wells during lean period, improve quality of ground water and community involvement in water resource management in the affected areas. The average cost of recharge structure per well was Rs. 4,000 for a total of 4.45 million dugwells and Rs. 1,536.75 crore were sanctioned for the scheme by the Ministry of Finance. The Committee learned from the Ministry that physical and financial status of this State Sector Scheme is being monitored on monthly basis in terms of number of beneficiaries identified, opening of bank account, release of subsidy in their bank accounts and construction of dug well recharge structures by the beneficiaries. They also note that a total of 7,72,249 beneficiares were issued subsidy and an amount of Rs.303.39 crore had been released against which Rs.274.13 crore have been utilized in respect of the Scheme upto 31.05.2011. The Committee note that this scheme has been implemented mainly in areas predominantly underlain by consolidated rocks viz. Andhra Pradesh, Maharashtra, Karnataka, Rajasthan, Tamil Nadu, Gujarat and Madhya Pradesh since about 80 per cent of these ground water stressed areas (over-exploited, critical and semi-critical) are located in these States where rapid decline of ground water levels have been noticed on long-term basis. The Committee recommend financial as well as physical targets achieved under the Scheme.

15. The Committee note that apart from artificial recharge to ground water, rain water harvesting is another great potential method of augmentation of ground water resources.

This technique involves collection of rainfall either for direct use for drinking, domestic, irrigation or diversion to underground aquifers through suitable techniques of artificial recharge for augmenting the ground water reservoir. The Committee also note that the Central Ground Water Authority (CGWA) has directed all States having 'over-exploited' areas to promote/adopt rain water harvesting, and that as a result of which 18 States and 4 Union Territories (UTs) have amended building by-laws for making rain water harvesting mandatory. Similarly, the Committee are also pleased to note that the CGWA directions for adoption of roof top water harvesting system to Group Housing Societies, Institutes, Hotels, Industries, Farm Houses, etc. in the notified areas of Delhi, Faridabad, Gurgaon, Ghaziabad and other areas of NCT Delhi having water table 8 meters below ground surface, has received encouraging responses, and that the Delhi Jal Board in NCT Delhi is providing assistance of 50 per cent of the cost upto Rs.1 lakh to Group Housing Societies, RWAs, Charitable Institutions, etc. to motivate them to opt for rain water harvesting. It is noted that financial assistance has been approved in 206 cases and that a total of 299 training programmes have so far been conducted for capacity building of stakeholders in designing of rain water harvesting structures to augment ground water in different terrains and hydrological conditions. During their study visit to the Central Leather Research Institute (CLRI), Chennai in June 2011, the Committee were informed that the CLRI has become self-sufficient in water supply after they resorted to rain water harvesting. The Committee believe that while such promotional efforts for rain water harvesting by the Ministry and cognate agencies are indeed laudable, more emphasis is needed to enforce mandatory rain water harvesting laws in those 18 States and 4 UTs which have already opted for them.

The remainder States may also be persuaded to take similar measures. The Committee are also of the view that the Government should explore the possibility of making rain water harvesting mandatory in all the buildings of the Government—Central as well the States, wherein their Ministries/Departments, etc. are located. They feel further feel that if more attractive incentives are offered for rain water harvesting, achievement of the desired objectives may not be far off.

16. The Committee note that under Section 5 of the Environment (Protection) Act, 1986, the CGWA has been given powers to give directions, and that courts of local jurisdiction are empowered to take cognizance of offences of non-compliance of such directions under section 15 of the Act. It is, therefore, imperative that directions issued by CGWA to local bodies like Delhi Development Authority (DDA), Municipal Corporation of Delhi (MCD), New Delhi Municipal Council (NDMC), Resident Welfare Associations (RWAs), etc. are complied with and all cases of non-compliance dealt with in accordance with the law. The Committee, therefore, recommend that the Ministry take appropriate and prompt steps to ensure better compliance to directions issued by the CGWA in the matter.

17. The Committee observe that increase in water use efficiency in agriculture can greatly reduce withdrawal of ground water and thus help preventing decline in ground water table. In this behalf, the Committee note that the Ministry has sanctioned 5,000 demonstrations under Farmers Participatory Action Research Programmes (FPARP) through 60 identified institutes in 25 States/UTs across the country at a cost of Rs. 24.4685 crores in the year 2007-08. As reported, 91.8 per cent of 5,000 demonstrations had been completed by the end of Kharif 2009, and 398 demonstrations were either completed or

nearing completion during Rabi 2009-10, and evaluation of the programme has been initiated by external agencies for assessing the final outcome of the programme. The Committee, therefore, urge the Ministry to make more vigorous efforts to ensure completion of the remaining demonstrations under FPARP and also seek to complete evaluation process of the programme by external agencies, which is in place presently. They would like to be apprised of concrete action taken by the Ministry in the matter.

18. The Committee were apprised that several works related to water conservation have been carried out under MNRERG Scheme, viz. water conservation and water harvesting, drought proofing including afforestation and tree plantation, irrigation canals including micro and minor irrigation works, provision of irrigation facility to lands belonging to SCs/STs or to beneficiaries of land reforms or of Indira Awas Yojana of the Government of India. The Committee further note the Ministry's reply that water conservation works undertaken in the MNREGS by construction of water harvesting and artificial recharge structures like check dams, village ponds, minor irrigation works, renovation of traditional water conservation structures, etc. are beneficial for recharging and conserving the ground water as per local requirements and that the augmentation of recharged water will lead to stabilization / rising of water levels in the area. The Committee are of the unanimous but considered view that focused attention be given by Ministry to works related to water conservation under MNREGS so that water conservation, including ground water conservation and management becomes a collective movement of the people all over the country. The Government also needs to review periodically the impact of such works on the level of ground water, its conservation, availability and the quality of water. The

Committee also desire the Ministry to explore the possibility of adopting models of ground water management already practised abroad, namely mandatory registration of wells, introduction of well permits, national well inventory, well metering, etc. in the works taken up under MNREG Scheme to promote their use among the people at large.

19. The Committee note that the Government launched in the year 2005 a pilot scheme called 'National Project for Repair, Renovation & Restoration (RRR) of Water Bodies directly linked to Agriculture' with an estimated cost of Rs. 300 crore to be shared by the Centre and the States in ratio of 3:1. The objectives of the scheme were to restore and augment storage capacities of water bodies, and to recover and extend their lost irrigation potential. The Ministry informed the Committee that a total of 1,098 schemes with an estimated amount of Rs. 299.91 crore have been approved, works of 1,054 water bodies completed, works in 13 water bodies have been dropped while work was in progress in 31 water bodies in the State of Maharashtra due to late approval. The evaluation reports received from Water Technology Centre, Bhubaneswar, Water and Land Management and Research Institute, Hyderabad and Centre for Water Resources Development and Management, Kozhikode, Kerala reportedly indicated considerable increase in storage capacities of water bodies as well as increase in agricultural productivity in their command areas. The Committee desire the Ministry to intimate the reasons for dropping of the works in 13 water bodies and the status of 31 ongoing works in Maharashtra. Besides, the Committee are given to understand that another programme for rejuvenation of water bodies was launched by the Government in 2009 with the assistance of World Bank and that projects have been taken up in Andhra Pradesh, Karnataka, Tamil Nadu and Orissa, with the first instalment being

released to the States of Karnataka and Orissa. The Committee earnestly desire the Ministry to extend this World Bank aided programme for repair, renovation and restoration of water bodies to other remaining States particularly perennial drought prone States such as Rajasthan, Gujarat and Madhya Pradesh to increase wider coverage of the programme.

20. The Committee regret to learn from MoE&F that the system of prosecution has achieved little success as far as criminal prosecution of environmental offenders is concerned, and further that nobody has been given imprisonment till date on this account. According to the MoE&F, it is constituting National Environment Protection Authority in which they are planning to insert a provision for economic penalty against polluters of environment including rivers/water bodies. Given the fact that the present criminal prosecution system for environmental offenders in the country has not been a success and that polluters of rivers/water bodies have been shielded behind the protection cover of the lengthy and time consuming judicial process, the Committee recommend the Government to expedite the formation of National Environment Protection Authority which will hopefully impose penalty on offending industrialists, polluters etc. The Committee would like to be informed of the progress made in this regard.

21. The Committee are pleased to note that the Government has in 2007 instituted two annual awards, namely 'Ground Water Augmentation Awards' (Bhoomijal Samvardhan Puraskar) and 'National Water Award' carrying cash awards of Rs.1 lakh and Rs.10 lakh respectively to encourage the NGOs/Gram Panchayats/Urban Local Bodies (for population upto 1 lakh) / Institutions/Corporate Sector and individuals for adopting innovative practices of ground water augmentation by rain water harvesting and creating awareness in the target

areas. Besides the Ministry's proposal to use IT Kiosks installed in big villages to propagate information on ground water in local language with pictorial depiction and also plans to make available the expertise of scientists deployed in districts for teaming up with district magistrates and panchayats in its drive to have effective water conservation, development, augmentation and exploitation, the Committee also note that the Ministry plans to deal with the problem of shortage of scientific manpower at district levels. The Committee hope that the efforts of the Ministry to encourage the local bodies etc. and to create awareness among the target areas will fructify soon. The Committee would like to be apprised of the positive outcome of the steps initiated by the CGWB for mass awareness campaigns throughout the country by involving Central/State/NGOs, voluntary organizations, RWAs, educational institutions, industries and individuals as also the impact of all other connected efforts.

22. The Committee note that though water is a scarce and precious natural resources, it is a State subject. Quite often, particularly in water scarce States, there are feuds between them over water sharing. Taking note of the recurrent disputes between certain States and regions over water sharing, the Committee hardly need to underline the need for evolving national planning, development, conservation, exploitation and distribution of water in an equitable and sustainable manner. The representative of the Ministry of Water Resources when asked, conceded the need for bringing 'water' in the Union List or the Concurrent List. Considering the fact that water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage, etc. figures in the State List, it is, however, subject to entry 56 in the Union List of the Constitution insofar as it relates to regulation and

development of Inter-State rivers and river valleys if is so declared by Parliament by law to be expedient in the public interest. The Committee would urge the Government to initiate steps in the right earnest to strive to build national consensus to bring water either in the Union List or in the Concurrent List after due consultation with the State Governments so that a comprehensive national plan of action is evolved for water conservation, development, exploitation and equitable distribution in the larger and long term national interest. The Committee recommend that the draft proposal in this regard may be initiated by the Ministry expeditiously.

23. Keeping in view the apprehension of diversion of waters of some international rivers by the riparian country, the Committee urge the Government to furnish complete data of the major river systems of the country, indicating the volume of water in each river system at the point where the river enters India and the volume at the point where it falls into the sea or the flows into the territory of adjoining country, and also the volume of water diverted or utilized for irrigation purposes within the country, river-system wise for the last ten years.

NEW DELHI;
29 August, 2011
07 Bhadrapada, 1933 (Saka)

DIP GOGOI
Chairman,
Standing Committee on Water Resources

PART – III

(I) MINUTES

MINUTES OF THE SEVENTH SITTING OF THE STANDING COMMITTEE ON WATER RESOURCES (2009-10) HELD ON TUESDAY, 09 FEBRUARY 2010

The Committee sat from 1500 hours to 1710 hours in Committee Room 'D', Ground Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Beni Prasad Verma – Chairman

MEMBERS

LOK SABHA

5. Shri Ghanshyam Anuragi
6. Shri Mahendrasinh P. Chauhan
7. Shri Sher Singh Ghubaya
8. Shri Haribhau Jawale
9. Shri Virender Kashyap
10. Shri Ramashankar Rajbhar
11. Shri S.P.Y. Reddy
12. Shri Arjun Roy
13. Smt. J. Shantha
14. Shri G.M. Siddeshwara
15. Smt. Annu Tandon
13. Dr. P. Venugopal (Tiruvallur)
14. Shri Sajjan Verma

RAJYA SABHA

15. Dr. Gyan Prakash Pilania
16. Shri Anil Madhav Dave
17. Shri Ranjitsinh Vijaysinh Mohite-Patil
18. Shri Mangala Kisan
19. Shri Kumar Deepak Das

SECRETARIAT

1.	Shri N.K. Sapra	-	Additional Secretary
2.	Shri Devender Singh	-	Joint Secretary
3.	Shri B.S. Dahiya	-	Director

REPRESENTATIVES OF THE MINISTRY OF WATER RESOURCES

1. Shri S. Manoharan, Special Secretary
2. Shri B.M. Jha, Chairman, CGWB
3. Shri Ram Mohan Mishra, Joint Secretary (Admn.)
4. Dr. S.C. Dhiman, Member (SML), CGWB

At the outset, the Chairman welcomed the Members of the Committee and the representatives of the Ministry of Water Resources and the Central Ground Water Board to the sitting of the Committee convened to have briefing on the subject, "Depletion of Ground Water Level".

2. After the introduction, the Special Secretary, Ministry of Water Resources gave a briefing on the subject. Thereafter, Chairman, Central Ground Water Board made a power point presentation on 'Depletion of Ground Water Level'. The Members sought clarifications on various issues relating to the subject which were replied to by the representatives of the Ministry and the Central Ground Water Board.

3. The following points emerged from the briefing and the concerns raised:

(i) Availability of water and utilisable water in the country;

(ii) Increasing extraction of ground water for various uses leading to depletion in ground water table;

(iii) Association of hydraulic engineers/scientists with the district administration in each district of the country so as to provide topography specific and up-to-date scientific advice to the developmental agencies and farmers;

(iv) Contamination of ground water and the life threatening health hazards particularly in certain parts of the country;

(v) Inclusion of 'water' in the Union or Concurrent List;

(vi) Need for disseminating awareness about judicious use of ground water;

(vii) Need for evolving appropriate parameters for water conservation and development in hilly areas;

(viii) Construction of check dams, revival of conventional methods of water harvesting and repair of old canals.

(The witnesses then withdrew)

4. The Committee then decided to hold another sitting for detailed examination of other stakeholders.

5. The verbatim proceedings of the sitting were kept for record.

The Committee then adjourned.

MINUTES OF THE TENTH SITTING OF THE STANDING COMMITTEE ON WATER RESOURCES (2009-10) HELD ON WEDNESDAY, 07 APRIL 2010

The Committee sat from 1150 hours to 1330 hours in Committee Room No. 53, First Floor, Parliament House, New Delhi.

PRESENT

Shri Beni Prasad Verma – Chairman

MEMBERS

LOK SABHA

2. Shri Ghanshyam Anuragi
3. Shri Mahendrasinh P. Chauhan
4. Shri Sher Singh Ghubaya
5. Shri Badri Ram Jakhar
6. Shri Haribhau Jawale
7. Shri Virender Kashyap
8. Shri Ramashankar Rajbhar
9. Shri K.R.G. Reddy
10. Shri S.P.Y. Reddy
11. Shri Arjun Roy
12. Smt. J. Shantha
13. Dr. P. Venugopal (Tiruvallur)
14. Shri Sajjan Verma

RAJYA SABHA

15. Dr. Gyan Prakash Pilania
16. Shri Ranjitsinh Vijaysinh Mohite-Patil
17. Shri Mangala Kisan
18. Dr. Ashok S. Ganguley

SECRETARIAT

1.	Shri N.K. Sapra	-	Additional Secretary
2.	Shri Devender Singh	-	Joint Secretary
3.	Shri B.S. Dahiya	-	Director

REPRESENTATIVES OF MINISTRIES/DEPARTMENTS

1. Shri U.N. Panjiar, Secretary, Ministry of Water Resources
2. Shri B.M. Jha, Chairman, Central Ground Water Board
3. Shri Rajneesh Dube, Joint Secretary, Ministry of Environment & Forests
4. Shri E.K. Majhi, JS (NRM), Ministry of Agriculture, Deptt of Agriculture & Coop.

At the outset, the Chairman welcomed the Members to the sitting of the Committee. Thereafter, the Chairman welcomed the representatives of the Ministries of Water Resources, Agriculture and Environment & Forests to the sitting of the Committee convened to have oral evidence on the subject 'Depletion in Ground Water Level'.

2. After the introduction, the Secretary, Ministry of Water Resources gave a brief overview of the subject. Thereafter, Chairman, Central Ground Water Board made a power point presentation on 'Depletion of Ground Water Level'. The Members sought clarifications on various issues related to the subject which were replied by the representatives of the Ministries/Departments. The points discussed during the sitting of the Committee included the gravity of the threat posed by contamination of ground water, pollution of rivers, the disposal of wastes by industries into the rivers/water bodies and the possible ways to overcome these problems.

3. The Committee expressed their concern over non submission of replies to the points raised by the Members during the last sitting of the Committee held on 22.03.2010. The Committee expected that the questions and concerns which remain unexplained for want of information during oral evidence, are replied to in writing by the Ministry in right earnest.

The verbatim proceedings of the sitting have been kept for record.

The Committee then adjourned.

MINUTES OF THE FOURTEENTH SITTING OF THE STANDING COMMITTEE ON WATER RESOURCES (2010-11) HELD ON THURSDAY, 11 AUGUST 2011

The Committee sat from 1530 hours to 1620 hours in Main Committee Room, Ground Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Dip Gogoi – Chairman

MEMBERS

LOK SABHA

2. Shri Ghanshyam Anuragi
3. Shri Mahendrasinh P. Chauhan
4. Shri Badri Ram Jakhar
5. Shri Haribhau Jawale
6. Shri Virender Kashyap
7. Shri Ramashankar Rajbhar
8. Shri S.P.Y. Reddy
9. Shri Arjun Roy
10. Smt. Annu Tandon
11. Shri Sajjan Verma

RAJYA SABHA

12. Dr. Ashok S. Ganguly
13. Shri Ranjitsinh Vijaysinh Mohite-Patil
14. Dr. Gyan Prakash Pilania
15. Smt. Bimla Kashyap Sood

SECRETARIAT

1. Shri N.K. Sapra - Secretary
2. Shri Devender Singh - Joint Secretary
2. Shri B.S. Dahiya - Director

At the outset, the Chairman welcomed the Members to the sitting of the Committee. Thereafter, the Committee took up for consideration (i) Memorandum No. 2 regarding Action Taken by Government on the recommendations/observations contained in the Fourth Report (15th Lok Sabha) on "Working of Brahmaputra Board"; and (ii) and draft Report on "Depletion of Ground Water Level".

2. After some discussion, the Committee adopted the above mentioned two Reports with certain amendments/modifications made during deliberations in the recommendation portions on Draft Report on 'Depletion of Ground Water Level'. These amendments/modifications include the following points:

(i) To incorporate the Committee's concern on the growing construction of septic tanks in the country side as another possible source of sub-soil contamination and the need for appropriate action in this regard;

(ii) To incorporate information on contaminated habitations indicating the nature of contamination of water State-wise/UTwise, giving total number of such habitations in the country;

(iii) To incorporate tanneries in the list of factories/industries located in high pollution zones which need to be regularly inspected by the Central Pollution Control Board (CPCB) and the District Collectors;

(iv) To extend the Scheme of demonstrative artificial recharge projects taken up by CGWB during the Eleventh Plan to other areas including Bundelkhand region of UP and Madhya Pradesh;

(v) To recommend to the Government to explore the possibility of making rain water harvesting mandatory for all Departments of Government – Central as well as State;

(vi) To incorporate perennial drought prone States, such as Rajasthan, Gujarat and Madhya Pradesh in the list of projects undertaken by the Government of India under pilot scheme in 2005 in respect of National Project for Repair, Renovation and Restoration of Water Bodies (RRR);

(vii) To urge the Government to furnish the complete data of the major national/international rivers of the country regarding their water volume of the flow, utilization for irrigation purpose and volume at the point of entry to India or at point of entry to other country or the sea for the last ten years; and

(viii) To change the title of the report to 'Augmentation of Depleted Ground Water Level, Sustainable Development, Conservation, Management, Use of Ground Water and Prevention of Water Pollution'.

3. The Committee then authorized the Chairman to finalize both the above mentioned Reports in view of the consequential changes after incorporating the above mentioned suggestions made by the Members

in the draft Report on "Depletion of Ground Water Level" and changes arising out of factual verification and to present the same to both the Houses of Parliament in the current Session.

The Committee then adjourned

(II) APPENDICES

Appendix-I

STATE WISE DETAILS OF WATER BODIES IDENTIFIED IN COURSE OF MINOR IRRIGATION CENSUS (2005) IN CONSULTATION WITH THE RESPECTIVE AGENCY OF THE STATE GOVERNMENTS

S.No.	Name of State	Number of water bodies
1	Andhra Pradesh	75561
2	Arunachal Pradesh	299
3	Assam	1020
4	Bihar	14555
5	Chhattisgarh	42717
6	Goa	2877
7	Gujarat	4150
8	Haryana	561
9	Himachal Pradesh	712
10	Jammu & Kashmir	781
11	Jharkhand	42210
12	Karnataka	27610
13	Kerala	11641
14	Madhya Pradesh	39831
15	Maharashtra	69631
16	Manipur	2
17	Meghalaya	270
18	Mizoram	610
19	Nagaland	161
20	Orissa	30651
21	Punjab	449
22	Rajasthan	2813
23	Sikkim	428
24	Tamil Nadu	38743
25	Tripura	468
26	Uttar Pradesh	3978
27	Uttarakhand	9690
28	West Bengal	118276
29	Andaman & Nicobars	1052
30	Chandigarh	0
31	Dadra & Nagar Haveli	44
32	Delhi	54
33	Pondicherry	14756
	Total	**556601**

Appendix – II

DETAILS OF RELEASE OF FUNDS UNDER THE PILOT SCHEME 'NATIONAL PROJECT FOR REPAIR, RENOVATION AND RESTORATION (RRR) OF WATER BODIES DIRECTLY LINKED TO AGRICULTURE'

Sl. No.	Name of State	Name of District	No. of water bodies included	Estimated cost (Rs. in crore)	Central share released (Rs. in crore)					State Total
					2004-05	2005-06	2006-07	2007-08	Total	
1	Andhra Pradesh	Mahabub Nagar	226	32.84	2.44	2.7	19.1200		24.2600	
		Anantpur	52	12.26		7.6625	1.3300		8.9925	**33.2525**
2	Chhattisgarh	Kabir Dham	10	2.236		1.1058	0.5712		1.6770	**1.677**
3	Gujarat	Sabarkantha	17	6.5512		2.654		2.1500	4.8040	
		Banaskantha	25	7.6653		3.1		1.2500	4.3500	**9.154**
4	H P	Mandi	13	1.0401		0.312	0.4681		0.7801	**0.7801**
5	J & K	Kupwara	22	3.0588		1.275	1.0200		2.2950	**2.295**
6	Jharkhand	Saraikela	22	2.7972	0.33	0.649	1.1200		2.0990	
		Palamu	38	8.5928	1.17	0.525	4.7500		6.4450	**8.544**
7	Karnataka	Gulbarga	116	35.537	4.42	10.13	12.0000		26.5500	
		Bangalore Rural	182	38.068	1	6.95	20.6010		28.5510	**55.101**
8	Kerala	Palakkad	10	1.36546		0.6	0.1900	0.2300	1.0200	
		Pathanamthitta	13	1.3847		0.526	0.1900	0.3200	1.0360	**2.0560**
9	Madhya Pradesh	Tikamgarh	5	3.923		0.70	0.7000	0.9900	2.3900	
		Shivpuri	65	41.28		15.00		10.6300	25.6300	**28.02**
10	Maharashtra	Beed	32	36.8828		13.831			13.8310	**13.831**
11	Orissa	Ganjam	68	12.82	1.14	6.81	1.6650		9.6150	
		Gajapati	59	6.01	0.55	3.19	0.7675		4.5075	**14.1225**
12	Rajasthan	Ajmer	4	4.489		2.25	1.1200		3.3700	
		Pali	1	2.45		1.5	0.3400		1.8400	**5.21**
13	Tamil Nadu	Sivagangai	8	1.222		0.458	0.4600		0.9180	
		Villupuram	38	9.372		3.5145	3.5100		7.0245	**7.9425**
14	West Bengal	Uttar Dinajpur	15	4.9181	0.74	0.565		2.0000	3.3050	
		South-24 Paraganas	51	18.552	0.21	1.2	1.2000	8.0000	10.6100	**13.915**
15	Bihar	Nalanda	1	1.18			0.2655		0.2655	
		Jamui	5	3.42			0.2340	0.9000	1.1340	**1.3995**
Total	**15**	**26**	**1098**	**299.9155**	**12**	**87.2078**	**71.6223**	**26.4700**	**197.3001**	**197.3001**